

2002

CLINICAL PROGRAM DESIGN
GROUP

PHASE IIA REPORT –

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Working Document

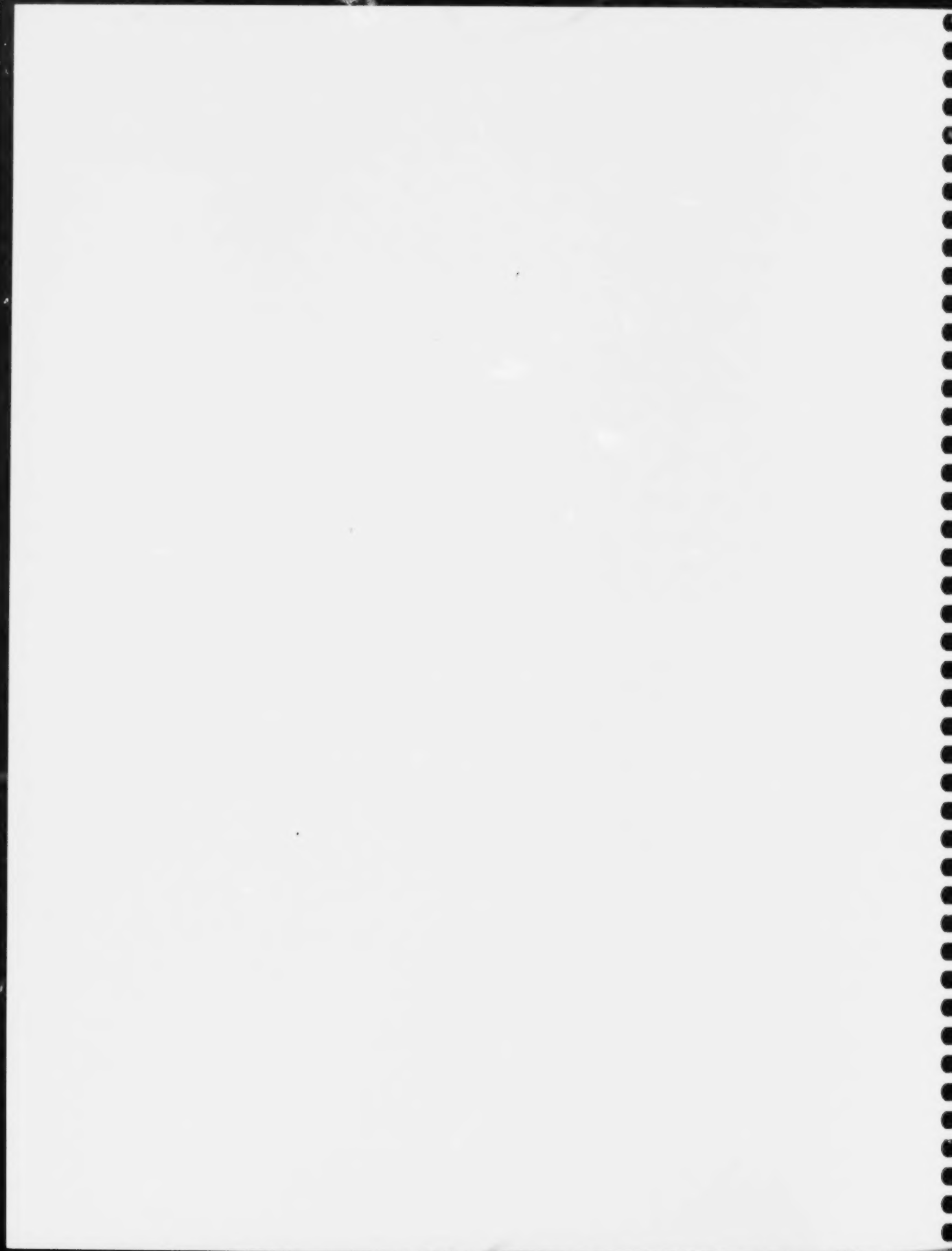


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CHAPTER 1: THE NEW BRUNSWICK HOSPITAL SYSTEM - CONSTRAINTS AND OPPORTUNITIES

THE NEED FOR CHANGE IN NEW BRUNSWICK HEALTH CARE PROVISION

The health care system in New Brunswick, as in provinces across Canada, has been in continual flux over the past decade. New Brunswick health care providers and health system managers deal with considerable challenges on a daily basis. When asked about the most important factors affecting health care delivery in their area, New Brunswick hospital caregivers and managers cited the following:

- recruitment, retention, and repatriation of health care providers, including physicians, nurses, and other health professionals;
- changing demographics of physicians, who may be retiring or reducing workload as they near retirement;
- changing demographics and composition of the population, which may increase the demand for hospital services;
- changing patterns in health and illness, with patients living longer but having more chronic disease;
- important advances in technology, including better access to information, as well as increased ability to diagnose and treat patients with new equipment and drugs;
- fiscal constraints, with seemingly inadequate government funding; and
- balance between widely dispersed services to maximize local access and provision of specialized services that require sufficient population base.

These are difficult and important challenges that will shape the way health care is provided in New Brunswick. It will not be possible to effectively address these challenges solely through increased funding – vision and hard work, on the part of many health care stakeholders, will be required.

The good news about the presence of these challenges is that it has created a climate where the need for adaptation and change is well recognized and generally accepted. Indeed, few health care stakeholders would say that no change is required for the health care system in New Brunswick to become more “healthy”. Developing and implementing changes gives the opportunity to improve existing systems while adapting to new needs, pressures, and challenges.

SETTING THE STAGE FOR CHANGE TO THE HOSPITAL SYSTEM

The hospital system in New Brunswick needs to evolve to continue to provide high quality care to New Brunswickers. Rising hospital system costs, increasing complexity (and age) of patients, and the demand for accountability for hospital care by the public are creating the impetus for change.

It is appropriate and timely to re-examine current New Brunswick hospital patient activity and resources with a view to improving how business is done. The Department of Health and Wellness (DHW), in collaboration with the Region Hospital Corporations (RHCs), has undertaken intensive analysis and planning work in the New Brunswick hospital system to investigate what the system does well and what it could improve. A number of initiatives have helped to build evidence for the need for change:

New Brunswick Health System Performance Initiative (September 2002): Based on clinical, financial, patient satisfaction, and system integration and organizational learning, the balanced scorecard for the New Brunswick hospital system revealed significant variation in performance among regions across the province.

New Brunswick Retrospective Review (report completed Fall 2001): This study of acute bed utilization showed that, comparable to other provinces in Canada that had conducted a similar study, there is substantial room for improving bed utilization. The concurrent review evaluation report, expected in Spring 2003, will provide further information about the effectiveness of concurrent review with a validated tool in reducing length of stay. Both the retrospective and concurrent review processes have identified systemic issues, across the continuum of care, that can affect the efficiency and effectiveness of health care in New Brunswick.

New Brunswick Population-based Patient Care Funding Distribution Model (1998): This funding model analyzes the funding of RHCs based on the types of patients they serve. The model has been applied to part of the patient care funding envelope of RHCs in the past two years. If this model were to be fully adopted, RHC funding would change considerably, compared to historical funding.

These initiatives, as well as anecdotal evidence from hospital care providers and managers, point to a need to rethink how hospital care is provided.

A HOSPITAL SYSTEM CRISIS?

“Report after report, from country after country, has documented the size of the gap between the best evidence based care that could be delivered to patients and the care they actually receive. Health systems fail to provide treatments that are known to work, persist in using treatments that don’t work, enforce delays, and tolerate high levels of error. Healthcare leaders are now recognising...that the healthcare system needs radically redesigning.” (Smith J, 2001).

Some New Brunswick hospital stakeholders have begun to express their concern that the hospital system is now in crisis. They believe that the challenges they face are becoming too great to address with isolated infusions of funding or individual quality improvement efforts.

Indeed, the hospital system is facing great challenges, including:

Shortages and variable distribution of human resources (nurses, physicians, and other professionals): New Brunswick has a serious shortage of many kinds of hospital care providers. Specialty physicians, family practitioners, nurses (special care and other), and other allied health professionals are difficult to recruit and retain, especially in areas that are more rural. Rural area physicians strive to meet the demand for care, and may wind up stressed out,

burned out, and often move to areas where they can find the support they need and a more sustainable lifestyle. Even in more urban areas, hospitals have had to close beds for periods because they could not staff them.

Fiscal constraints: Health care expenditures as a proportion of the province's budget have increased from 30.4% of government program spending in 1997/1998 to 35.1% in 2001/2002, the highest proportion of government program expenditures attributed to health expenditures in New Brunswick history (CIHI, 2002). While the proportion of government health expenditures directed to hospitals has remained at approximately 51% during this period, expenditures on drugs have risen steadily from 5% in 1997/1998 to a forecast of 6.5% of health expenditures in 2002/2003 (CIHI, 2002). New Brunswick's health care expenditure per capita, while on par with the Canadian average in 2002/2003 current dollars (\$2,318 vs. \$2,355), does not reflect increased needs due to the older age structure of the New Brunswick population and the labour costs incurred in the last few years (CIHI, 2002). In constant (1997/1998) dollars, New Brunswick health care expenditures per capita lag behind the Canadian average by 7% and are the third lowest in Canada (CIHI, 2002).

Risk to patients of fragmented care: In the current system, patients are often required to navigate through a virtual maze of health care services. They may visit their family practitioner, then see a specialist, and may be admitted to hospital for a procedure or an emergency. Yet, these areas, which many patients believe should be part of a seamless system, often remain quite separate. Patients can therefore slip through the cracks between these separate components in the system. There is currently no assurance that the family practitioner, the specialist, and the hospital care team(s) have shared information, assessments, and understanding about the patient's condition. This fragmentation of the health care system can pose a risk to patients because there is no process to ensure everyone (including the patient and their family) has the full information required for optimal care. Fragmentation may contribute to decreased quality of care, as well as inefficient use of resources.

For these challenges to be overcome, New Brunswick will need to fundamentally change some of the existing patterns of health care delivery, including the manner in which hospital care is provided and integrated into the health care delivery system. The New Brunswick Premier's Health Quality Council (PHQC) has recognized that "there is no question that fundamental change is needed to ensure our health system is truly responsive and sustainable" (PHQC, 2001). As a result, the Council recommends changes in health system governance and service delivery, including a greater focus on primary care. It is clear that New Brunswick cannot maintain "business as usual" in health care.

SPECIAL CHARACTERISTICS OF THE NEW BRUNSWICK HOSPITAL SYSTEM

New Brunswick has some special characteristics that must also be met by a changed hospital system.

Distribution of the population: New Brunswick has a small population, relative to other provinces, and population densities vary across the province. This variation poses unique challenges to service planning and delivery.

Language dynamics: As the only officially bilingual province in Canada, New Brunswick takes seriously its mandate to provide care in the patient's official language of choice. This will be a critical requirement for future health system changes, as patients must feel comfortable that they can receive the treatment they need and have explanations that they understand, in French or English. *Duplication of service in existing regions:* Under the current regional approach to system planning, many services are duplicated across regions. It is often true that consolidation of some program sites may provide adequate access and improved quality and sustainability. As noted above, consolidation carries the responsibility to develop the means to provide service to patients in the language of choice.

Control over the levers for change: In New Brunswick, compared to other provinces, the centralized DHW controls many of the levers for change in hospital care delivery. For example, the draft Hospital System Master Plan (1997), developed by the DHW, determines how many and which kinds of hospital beds the RHCs can operate. The Plan therefore effectively determines the size and scope of the hospital services that are provided within each region. The Hospital System Master Plan is not integrated with the planning of the physician workforce, so that it is difficult to match providers and services across the province. In addition, central bargaining, which occurs at the provincial level, results in wage rates being determined provincially, so that RHCs cannot determine some of their costs.

Any future hospital system change must acknowledge and address these special characteristics of the hospital system in New Brunswick.

CLINICAL PROGRAM DESIGN PROCESS AS A RESPONSE TO THE NEED FOR CHANGE

In 1999, the DHW held regional consultations for the development of a provincial accountability framework. Subsequently, the Clinical Program Design (CPD) group was established in April 2000, with a mandate to provide clinical input into system planning decisions including facility planning (the number and types of beds required for all levels of care) and program planning (the distribution of clinical programs to ensure equitable access, quality, and efficiency).

Immediate priorities for the CPD group were to:

- conduct an analysis of current service volumes and, following that, to identify program areas for further study;
- develop evidence-based recommendations concerning clinical program reconfiguration; and
- analyze the impacts of these options, including those pertaining to the Hospital System Master Plan and the Physician Resource Management Plan.

As the work of the CPD group proceeded, the consideration of clinical program planning and physician resources for a revised Hospital System Master Plan, the PHQC-recommended Provincial Health Plan, was given top priority. The CPD group was mandated to provide evidence-based analysis on the definition and configuration of clinical programs for the province. This work, along with analyses of non-clinical service provision, was intended to be incorporated into the development of a Provincial Health Plan.

The CPD report was presented to the DHW in March 2002. This version of the report is revised to address current planning needs and to identify additional data and analytic requirements that are necessary.

STAKEHOLDER INVOLVEMENT IN THE REDESIGN PROCESS

CPD group membership is made up of representatives from the eight RHCs, the Chair of the Physician Resource Advisory Committee, and DHW staff from Hospital Services and Medicare. THiNC Information Management Inc. provided expertise to the CPD group in data collection, analysis, project planning, and implementation.

The group has consulted regularly with RHC clinical and management stakeholders for input on the CPD process and for feedback on results of the process. Work sessions were held to make sure that health care stakeholders, including physicians, were involved in validating methodologies and data analysis. Their feedback and concerns have been incorporated throughout the CPD process.

CLINICAL PROGRAM ISSUES QUESTIONNAIRE

To identify clinical areas of priority and concern within each RHC, a questionnaire was distributed to RHC CEOs and staff in June 1999. Input was sought in clinical program areas where RHCs reported providing care at a greater level than elsewhere within the system, where they were not able to deliver care at a level sufficient to meet the needs of their population, and where they anticipated constraints in the next five years.

A number of common themes were identified in the responses of RHCs, including:

- problems of physician retention, recruitment, and remuneration;
- need for appropriately trained physicians and professional and technical staff;
- inadequate supply of family physicians;
- the aging physician population, relating to reduced hours and retirement;
- increased demand for services, as a result of an aging population;
- inappropriate use of acute care beds for patients awaiting alternative levels of care;
- increasing requirement to expand program support (funding, support services, technology infrastructure); and
- issues related to maintenance of existing programs (patient access, travel distance, hours of operation, language, and waiting times).

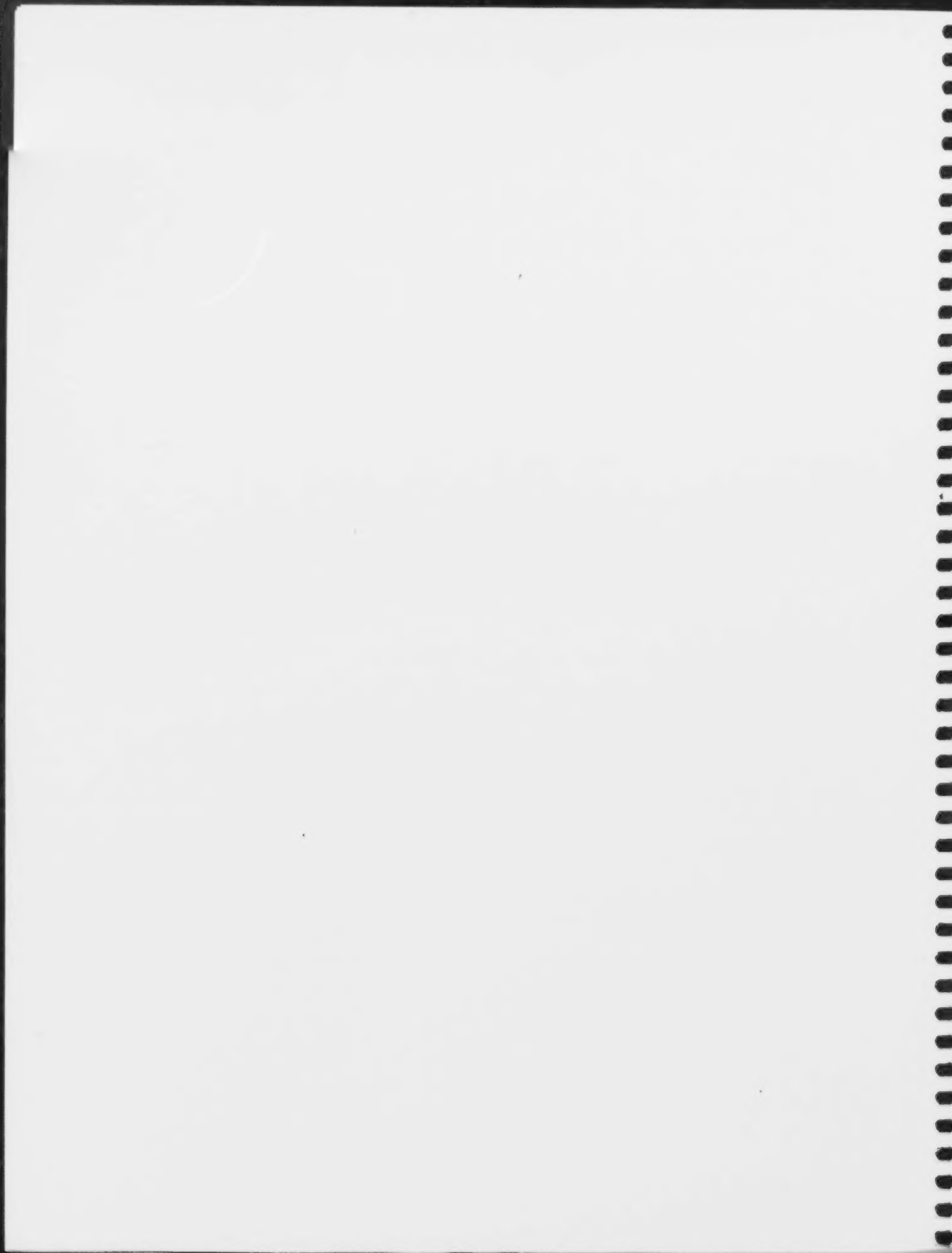
Details on the RHC questionnaire and responses can be found in Appendix A.

INCORPORATION OF FEEDBACK

To further inform the CPD process, DHW and THiNC Information Management Inc. staff made at least one site visit to each RHC early in the CPD process. Throughout the past two years, the CPD process has afforded RHC clinical and management staff the opportunity to review questionnaire responses, to discuss the CPD group's concepts and data analyses, and to provide feedback on methodologies used throughout the process. Accordingly, this feedback has been incorporated into the CPD group's deliberations leading to this report.

PURPOSE OF THIS REPORT

This Phase IIA Clinical Program Design Report is intended to summarize the analysis, discussion, and conclusions of the CPD group regarding the planning of larger clinical programs for New Brunswick. Using evidence-based analysis and integrating the clinical knowledge of the CPD group members, a vision for an integrated health system is proposed (Chapter 2), principles for planning integrated health care are outlined (Chapter 3), and approaches and tools for clinical program planning are described (Chapters 4 and 5). In Chapter 6, individual clinical programs are analyzed and conclusions are made about the best configurations of these programs to meet the principles adopted by the CPD group. Conclusions are summarized in Chapter 7. A glossary of terms is provided at the end of this report, which defines and explains key terms used throughout the text. References are also included at the end of the report. Appendices offer more detail regarding some of the concepts and methodologies discussed in the report, as well as detailed tables and graphs showing program-specific analyses.



CHAPTER 2: VISION FOR THE FUTURE: AN INTEGRATED HEALTH SYSTEM

POPULATION-BASED PLANNING

How does one go about building a new hospital system that addresses the challenges and special characteristics of New Brunswick? Through focusing primarily on the patients in the system, the CPD group used a population needs-based approach to planning. Health system planning based on population needs has received much attention from health system planners and researchers (Roos et. al, 1999; Roos et al, 1999, Roos 1999) and they tend to agree that the key is to focus on population needs or demand, to determine what services are required. Eli Ginsberg's definition of regionalization follows this population-based approach: "a form of resource allocation or service delivery rooted in geography." Ginsberg identified that physician distribution, capital expenditures, and patient flow are critical factors in meeting the needs of a population within a defined area. These factors must be altered, by reallocating resources or adjusting service delivery mechanisms (e.g., human resources, equipment, etc.) to meet and address changing population needs (Ginsberg, 1977).

Building a health system from a population-based perspective also means that the planning focus is primarily oriented towards the people who are served by the system, not the people who work within it (e.g., physicians, nurses, administrators, etc.). The goal of this planning is to remove the constraints of the existing system that may hamper seamless provision of services to patients.

WHAT IS AN INTEGRATED HEALTH SYSTEM?

In the past decade, health care providers, governments, and system managers have begun to articulate their vision for health care as an integrated system. Recently in New Brunswick, a network of Regional Health Authorities (RHA) has been legislated, that would "begin the evolution to a more integrated health care system" (New Brunswick DHW, 2001). The Minister of Health and Wellness, Elvy Robichaud, has stated his "commitment to make our current health care system more of a single, patient-focused, community-based integrated health services system" (New Brunswick Government, 2001). This begs the question: what is an integrated health system, and what will it mean for hospital services in New Brunswick?

Stephen M. Shortell is credited as an expert in integrated health systems knowledge. He defines clinical integration as the extent to which patient care services are coordinated across people, functions, activities, and sites over time, to maximize the value of services delivered to patients (Shortell et al., 2001). He found that barriers to achieving clinical integration include:

- lack of a specific strategy and implementation plan for the system;
- dispersed geography;
- institutional autonomy of hospitals;

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- inadequate information systems;
- employee fears of job loss and physician fears of autonomy loss; and
- lack of a stable health care environment.

These may appear to be daunting barriers that are commonly experienced in health care systems across Canada; however, the benefits of an integrated health system outweigh the risks of overcoming these barriers.

For example, an integrated health system facilitates the following:

- health care planning from the patient's perspective;
- access to appropriate treatment in the nearest available location, by the right provider;
- knowledge of where to go for what treatment; understanding of roles of facilities, by patients and providers; and
- formal connections between facilities providing health care services.

The vision of the CPD group has been to create planning tools that enable the realization of a truly integrated hospital system for the province of New Brunswick. This will help to move towards integrating hospital and other health care services, and thus realize the benefits that integration can bring.

CHAPTER 3: FOUNDATION PRINCIPLES FOR AN INTEGRATED HOSPITAL SYSTEM

FOUNDATIONS FOR HOSPITAL PLANNING: EFFICIENCY, QUALITY, SUSTAINABILITY, AND ACCESS

The principles of **efficiency, quality, and access** are key drivers of clinical program planning that are accepted as fundamental by health care providers and funders today. They are essential to the development of an integrated health system, as they ensure that health care services meet the needs and expectations of the people served and that health services will continue to be available in the future. These principles have been measured and evaluated in New Brunswick's Performance Indicators Project (Phase I).

Newer to the health care scene, and gaining increased attention in areas with more dispersed populations, such as New Brunswick, is the principle of clinical **sustainability**. Proponents of the importance of clinical sustainability in health care point to the difficulties of maintaining small programs or facilities without the population base or the human resources to sustain them. They argue that minimum thresholds for referral populations and for clinical resources can help to build sustainable programs and facilities, which will ultimately help to build efficient, high quality, integrated health services. Sustainability of programs completes the list of fundamental principles for health planning.

While most would agree that the foremost consideration that should be driving the need for reconfiguring acute care services is the need to improve quality, in many jurisdictions what is actually driving it is the need to reduce costs and to cope with staffing problems, new technology, and public expectations (Smith R, 1999). While some argue that comprehensive medical and surgical care of the highest quality requires the concentration of resources and skills into larger organizational units, it may be that different solutions are required for medical versus surgical care with a mixture of concentration where warranted and provision of services on a local basis where feasible. In all cases, those planning services should think about the entire system rather than just parts of it (Smith R, 1999).

While the principles of quality, access, efficiency, and sustainability are fundamentally linked within the operations of health care, each is addressed separately here, to clearly define and explain each.

EFFICIENCY

Efficiency is the principle that has gained the most publicity in health care management in Canada over the past decade. Hospitals and other health care providers have been urged to 'do more with less'. Increasing efficiency is, in fact, the process of creating more outputs with fewer or equal inputs. In hospitals, this has primarily meant treating more (or more resource intensive) patients with the same (or fewer) staff.

Increased demand for accountability from the public and from funders has meant that efficiency measurements have been calculated and analyzed for hospitals across the province. For example, the New Brunswick Performance Indicators Project (Phase I) has used clinical and financial data to measure efficiency with regard to hospital length of stay, staff productivity in selected departments, and overall use of financial resources (Provincial Utilization Management Coordinating Committee, 1999). In relation to health planning, the principle of efficiency can be upheld by avoiding duplication of services and making the best use of available human and financial resources.

QUALITY

Quality in health care remains a difficult but important principle. Definitions of quality care vary and there is little agreement on how to measure quality. Generally, measures of morbidity and other outcomes are considered indicative of quality care, but evidence is lacking about overall quality indicators for health systems.

In considering quality with regard to the case volume of either individual physicians or hospitals, the evidence regarding volume/outcome relationships generally is observational, of variable quality, and often equivocal. However, for high-risk procedures such as elective abdominal aortic aneurysm repair, carotid endarterectomy, coronary bypass, percutaneous coronary angioplasty, neonatal intensive care for high-risk infants, and major pancreatic and gastrointestinal cancer surgery, the evidence points to a clearer relationship where higher volumes are associated with better outcomes (Nuffield 1996, Buchan 1997, Dudley 2000, Birkmeyer 2000a, Birkmeyer 2000b). In the United States, a large coalition of employers, the Leapfrog Group will soon require hospitals caring for their employees to meet volume standards for five high-risk procedures (Birkmeyer 2001) and neonatal services (Leapfrog Group 2000). Better outcomes in high-volume hospitals do not simply reflect more skilful surgeons. They likely reflect greater institutional proficiency with all aspects of care including patient selection, anaesthesia, and postoperative care (Birkmeyer 2000b). For most other clinical services, the literature is equivocal with regard to a relationship between higher volumes and better outcomes. Hence, low-volume clinical services in individual institutions cannot be assumed, from a planning perspective, to be less favourable based on risk and safety alone (Nuffield 1996).

In relation to health planning, quality ought to be considered in detail only for specific procedures, but remains a crucial over-arching goal in planning services.

SUSTAINABILITY

Other considerations, pertaining to quality, efficiency, and access, tend to mitigate against planning for clinical programs in relatively small volume sites, unless constrained by geographic isolation factors. First, quality of care for most acute hospital services requires the provision of continuously available service to meet emergent and urgent needs. In practical terms, this means that a clinical service ought to have sufficient volume to support a number of physicians and nurses who can provide continuous coverage. Related to quality and access is the principle of the sustainability of a program. That is, a program ought to be able to continue to operate without significant disruption in the face of loss of key individual providers of care. Small programs based on one or two physicians are most at risk in this regard. Larger facilities, with higher clinical program volumes, generally have the advantage of economies of scale and, therefore, greater efficiency.

These factors have led to the development of a minimum size for a sustainable program, generally correlated with a minimum number of active physicians supporting the program. The generally accepted minimum program size is the average caseload of three to five active practitioners, depending on the nature of the program. This suggests that a minimum of three to five active practitioners is required to adequately staff a program of care, to cover on-call and fluctuations in demand, to cover for periodic and unexpected absences of colleagues, to facilitate recruitment, and to support continuing medical education activities. In addition, this minimum complement is generally associated with the availability of specialized diagnostic and operative equipment and expertise of colleagues in other disciplines. The inter-dependencies among programs must also be recognized with respect to sustainability, where services such as trauma rely upon several sustainable programs to deliver high quality care (e.g., neurosurgery, orthopaedic surgery, general surgery, etc.).

For a program to be sustainable, it must have a sufficient case volume or referral population to warrant three to five active practitioners. Therefore, sustainability is related both to volume of services provided (or potential volume of services), as well as health care human resources.

ACCESS

As part of the integrated health planning approach defined within this report, access to services plays a key role in determining hospital capacity and physician resources required for clinical programs. The following outlines the key dimensions of access accepted by the CPD group, as they relate to clinical program planning:

- *Distributive Access:* i.e., do patients/populations get the service? This type of access is measured by comparing the utilization of services across groups of patients. The analysis of rate variation across regions in this report addresses distributive access.
- *Temporal Access:* i.e., how long do people wait? This aspect of access can be measured by examining waiting times for certain procedures or consultations. Data to measure this aspect of access are not readily available and, therefore, it is not analyzed in this report. Recommendations from the Provincial Utilization Management Coordinating Committee Performance Indicators Project support the reliable and standardized collection of waiting times for certain procedures, including breast cancer screening and magnetic resonance imaging (MRI). As these data become available and are of sufficient quality, analyses can help to inform clinical program planning in these areas.
- *Geographic Access:* i.e., how far do people travel? This aspect of access can be measured using distances that patients travel for service. This is addressed in this report, using the road distance from the patient's home to the facility where service was provided.
- *Language Access:* The CPD group identified that in New Brunswick, access to service in the patient's language of choice was a key aspect of access. Data are not readily available on which to base direct analyses of Francophone and Anglophone hospital utilization and the provision of service in the language of choice. Thus, this aspect of access cannot be quantitatively addressed in this report. However, the issue of access to services in the language of choice must be formally addressed in planning the distribution of hospital services in light of DHW goals and provincial legislation.

While all dimensions of access ought to be satisfied in an ideal health care system, consideration of the relative importance of these dimensions ought to be made in situations where policies may lead to competing influences on access dimensions. This applies not only to prioritization of dimensions of access, but is equally applicable in the balancing of the principles of efficiency, quality, sustainability, and access. Generally, quality and sustainability considerations that restrict geographic access are apparent for more specialized services. Where quality, sustainability, and efficiency can be achieved, it is clear that provision of service close to patient residence or workplace is preferable.

APPLYING FOUNDATION PRINCIPLES TO CLINICAL PROGRAM PLANNING

These principles have guided the CPD group in their discussions and conclusions regarding clinical program planning. Where possible, these principles were evaluated using concrete measurement and analyses. In some areas, the measurement of these principles was not feasible, given lack of available data, but the principle was applied at a more general level to develop consistent, evidence-based conclusions.

CHAPTER 4: PLANNING FOR AN INTEGRATED HOSPITAL SYSTEM

INTEGRATING PLANNING FOR FACILITY AND PHYSICIAN PLANNING

Health care planning has traditionally been divided between planning facilities, with traditional measures of bed numbers and hospital staffing, and physician supply planning, based on numbers of physicians. In addition, plans have balanced the need to meet existing demand and reflect practice patterns, and to anticipate future needs of the population. Formal approaches to integrate facility and physician planning have been lacking.

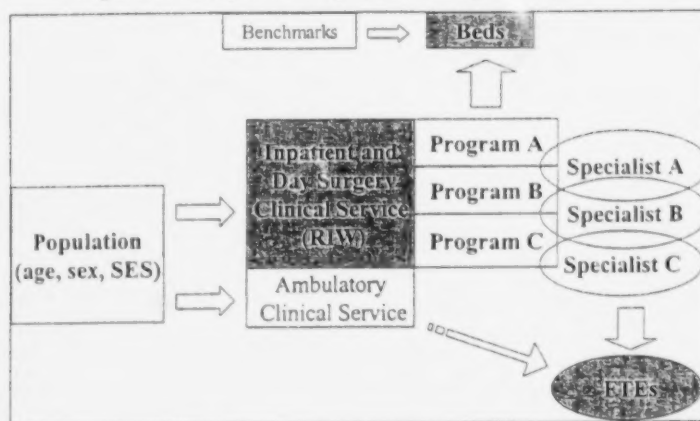
A NEW BRUNSWICK APPROACH TO INTEGRATED HOSPITAL PLANNING

The CPD group has used several parameters to develop, define, and analyze clinical programs in an integrated hospital network. These parameters address the areas of utilization rates, physician resources, and structural resources. Figure 1 depicts the relationship among these areas, including utilization (measured in Resource Intensity Weights (RIWs)), physician resources (measured in Full-Time Equivalents (FTEs)), and hospital capacity (measured in beds).

In this model, characteristics of the population determine what services are needed. For inpatient hospital services, these services are provided within clinical programs, which generally have designated beds. Here, we use a basic definition of bed, which is related to the capacity of the program to meet the variable daily census numbers associated with patients within the program. The number of beds is determined by the service required, as well as other factors, such as length of stay or other utilization parameters.

Clinical programs are generally supported by specialist physicians, who may work within several hospital programs. The required physician FTEs are based on the services required. The relationships among these various parameters are ongoing and evolutionary.

Figure 1: Integrated Hospital Planning Model



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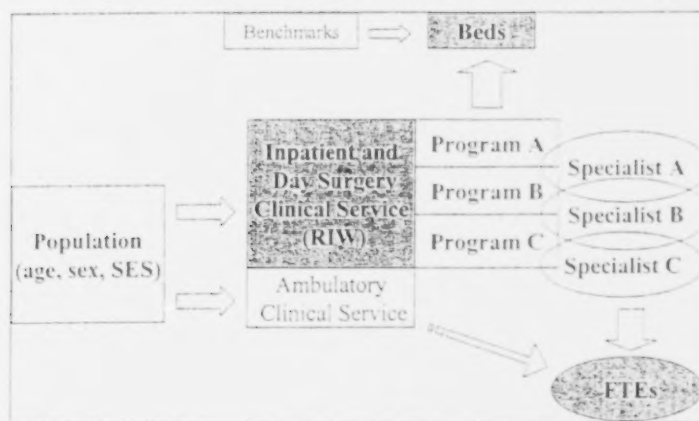
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Clinical programs are generally supported by specialist physicians, who may work within several hospital programs. The required physician FTEs are based on the services required. The relationships among these various parameters are ongoing and evolutionary.

Figure 1: Integrated Hospital Planning Model



This model was used to understand and illustrate the factors that must be measured to appropriately determine the outputs of clinical program planning. These outputs include:

- utilization rates (measured in RIWs);
- physician FTEs; and
- hospital census capacity (measured in beds).

Physician planning is also an important part of clinical program planning. Elements of physician planning not addressed within the purview of clinical program planning include the need for population-based planning for physician FTEs and the importance of physician demographics, work environment, and scope of practice in shaping future physician distribution patterns. These are critical elements to planning for a hospital or health care system. The integrated hospital planning model within this report focuses more specifically on the physician FTEs required to support sustainable clinical programs; the CPD group recognizes, however, that there are many other factors affecting physician planning.

ACTIVITIES IN OTHER JURISDICTIONS

The process of using evidence to plan and reconfigure clinical programs, such as the one being undertaken here, is unique in its scope and breadth. However, other jurisdictions have undertaken processes that helped to inform the CPD group's tasks.

For example, over the past several years, the Manitoba Centre for Health Policy and Evaluation has conducted analyses regarding the physician resources required to serve the population of Manitoba (Roos et al., 1996; Roos et al., 1997; Roos et al., 1999). These planning analyses have informed policy decisions about the location of physician resources and access to specialist services. Many of the statistical techniques used in these analyses have been incorporated into the New Brunswick approach presented in this report, particularly in the area of physician resource analyses.

The results of Saskatchewan's "Commission on Medicare", submitted to government in April 2001, are another example of policy informed by evidence and consultation (Fyke, 2001). The Commission report presents a vision for community-based preventive and primary care and for specialty services that is predicated on adoption of the principles of quality and sustainability for health care in Saskatchewan. While the scope of the Commission report is broader than this report, the principles and conclusions are consistent with the mandate and conclusions of the New Brunswick CPD group.

The task of sizing the hospital system has been undertaken by a number of provincial groups. Particularly relevant is the work of the Ontario Joint Ministry of Health/Ontario Hospital Association Working Group on Rural and Northern Health Parameters and Benchmarks (Ontario Joint MoH/OHA Working Group, 1998). This group established a set of principles and parameters based on existing hospital data to identify the various roles of rural hospitals in the context of an integrated health care delivery system.

Recently, the Nova Scotia Clinical Services Steering Committee issued a report entitled "Making Better Health Care Decisions for Nova Scotia" (Nova Scotia Clinical Services Steering Committee, 2001). This report on the state of acute inpatient services in Nova Scotia provides an evidence-based framework for planning this sector of the health care system. The framework is founded on delineation of the roles of individual hospitals, according to the demand for care and complexity of services, within the context of a network of health care provision.

The Kirby Report (Kirby 2002) has made recommendations on restructuring the current hospital and doctor system to make it more efficient and more effective in providing timely and quality patient care. The Kirby Committee stressed that unless changes are made to the structure and functioning of the healthcare system, no amount of new money will make the current system sustainable over the long term. In addition to addressing healthcare funding levels, regional governance, primary care reform, system integration, and waiting time guarantees, the Kirby Committee concluded that service-based funding was the preferred approach to funding the hospital sector.

The report of the Commission on the Future of Health Care, "Building on Values: The Future of Health Care in Canada" (the Romanow report), released in November 2002, recommends sweeping changes to ensure the long-term sustainability of the Canadian health care system. Report highlights include:

- renewing the foundations of the health care system by establishing a Canadian Health Covenant and updating the Canada Health Act;
- establishing a Health Council of Canada, to involve governments, providers, and citizens in collaborating on health care issues;
- recommending new budget of approximately \$3.5 billion in 2003/2004, \$5 billion in 2004/2005, and \$6.5 billion in 2005/2006;
- integrating priority home care services within the Canada Health Act, as well as catastrophic drug coverage;
- improving waitlist management, promoting primary care reform, and increasing the supply of advanced diagnostics services and health care providers; and
- supporting a national electronic health record system.

The task of delineating an Integrated Hospital Planning approach for New Brunswick is necessarily unique, meeting provincial criteria, constraints, and requirements. However, initiatives in other jurisdictions and relevant research literature informed the New Brunswick approach.

CHAPTER 5: TOOLS FOR CLINICAL PROGRAM PLANNING

DEFINITIONS AND METHODOLOGIES TO SUPPORT PROGRAM PLANNING

The integrated health planning approach described in Chapter 4 shows the importance of linking physician and service volume measures in configuring clinical programs. This section describes the analytical tools that are used to develop a plan for hospital programs in New Brunswick. These tools are then applied to New Brunswick inpatient, day surgery, and ambulatory care data to inform planning, as described in Chapter 6.

Application of these tools is based on definitions of clinical programs and of the degree of centralization or decentralization of services. These definitions and methodologies were developed in the early stages of the CPD group's work and are discussed in Appendix B. The definition of clinical programs was customized to New Brunswick practice patterns to improve the validity of program planning analysis in the province. The degree of distribution was also defined, with some types of cases (i.e., Case Mix Groups (CMGs)) being decentralized, some regional, and some centralized. The CPD group adopted these definitions and methodologies in Phase I of their work. Figure 2 summarizes the distribution of RIWs in New Brunswick by clinical program and by dimension of distribution.

**Figure 2: Annualized Weighted Cases (RIW) by Program and Dimension of Distribution
(rounded to nearest hundred, 1997/1998 to 1999/2000 annualized)**

Program	Decentralized	Regional	Centralized	Total
Family Practice	41,100	16,500	-	57,600
General Surgery	6,600	7,600	-	14,200
Obstetrics/Gynaecology	1,100	10,500	-	11,600
Orthopedic Surgery	400	9,700	800	10,900
Cardiology	6,100	2,400	2,000	10,500
Psychiatry	3,300	4,600	-	7,900
Urology	2,000	3,100	100	5,200
Vascular Surgery	600	3,200	-	3,800
Neurosurgery	500	1,200	1,900	3,600
Haematology	400	2,600	500	3,500
Otolaryngology	100	2,700	-	2,800
Plastic Surgery	400	2,300	100	2,800
Ophthalmology	-	2,300	100	2,400
Neonatology	-	1,200	1,200	2,400
Cardiovascular Surgery	-	-	2,200	2,200
Thoracic Surgery	-	2,100	-	2,100
Nephrology	900	200	700	1,800
Rheumatology	500	300	-	800
Dentistry	-	500	-	500
Infectious Disease	-	300	200	500
Oral Surgery	-	100	200	300
Paediatrics	-	300	-	300
Total	64,000	73,700	10,000	147,700

DATA SOURCES AND CAUTIONS

The data used in the analyses in this report are from the 1999/2000 fiscal year, as these data were the most recent available. While these data are useful to establish the tools appropriate for system planning and for understanding the mechanics of the current system, it will be important to update the analyses with more recent data as they become available. Planning decisions ought to be made on the most recent data available, yet the implemented plans and policies these data inform should be flexible enough to address the normal variations that occur over short time periods in many areas of the health care system.

Additionally, it is stressed that the analysis provided in this report is intended to show high-level, general trends and patterns for clinical programs in the province. As such, it does not address the nuances of practice of specific physicians or of specific facilities. Therefore, key stakeholders, including clinicians, managers, staff, and consumers, must be involved in more detailed planning, siting, and implementation initiatives for clinical programs.

Recent concerns regarding data quality and coding variations, prompted by funding formula planning in Ontario, have led CIHI to conclude that the Complexity Overlay may be unreliable for hospital funding and for many efficiency comparisons. This has led to the removal of the Complexity Overlay from Case Mix Groups and Resource Intensity Weights until after its re-development based on ICD-10-CA/CCI data. This, combined with the release of 2001/2002 fiscal year data for New Brunswick and the availability of data from the 2001 Census will necessitate that routine revisions to the planning parameters outlined within this report be undertaken. Any such revision requires particular attention to the differential impact of uniform estimates of resource intensity on urban vs. rural and large vs. small hospitals.

POPULATION BASED PARAMETERS

Population based parameters describe the measures and observations that are made based on characteristics of the population of regions in which hospital care is provided. This essentially describes the demand for hospital services by the New Brunswick population. Comparisons of population based parameters across regions can show variation in the access to services by different region populations.

The two population based analyses that have informed the observations and conclusions in this report are described in this section.

PATIENT FLOW PARAMETERS: WHERE ARE NEW BRUNSWICKERS GOING FOR SERVICE?

This analysis determines where New Brunswickers are receiving hospital services both in and outside of New Brunswick. It also identifies patients from outside of New Brunswick who receive service in New Brunswick hospitals. The volumes of service are shown using RIWs. Patient flow results for all clinical activity in New Brunswick are shown in Figure 3.

Figure 3: Overall Patient Flow (measured in RIW - 1999/2000)

Patient came from	Region	Treated at								Out of Prov.	Total
		RHC1B	RHC1SE	RHC2	RHC3	RHC4	RHC5	RHC6	RHC7		
1		12,186	19,771	1,015	99	6	38	28	104	166	33,413
2		55	352	28,750	1,014	1	12	11	8	128	30,331
3		38	171	2,555	27,968	201	98	32	56	159	31,278
4		78	62	408	587	9,272	196	61	3	395	11,062
5		390	518	233	30	35	6,154	500	29	68	7,957
6		1,259	794	458	58	5	138	13,500	155	175	16,542
7		655	1,210	519	311	-	13	657	8,052	71	11,488
Other Prov		535	1,754	516	262	554	1,487	119	67	7	5,301
Total		15,196	24,632	34,454	30,329	10,074	8,136	14,908	8,474	1,169	147,372

Patient flow information is helpful to understand patterns of service for patients across the province. In New Brunswick, patients are generally treated within their region of residence. As will be discussed in Chapter 6 of this report, some services are necessarily required to be delivered in facilities outside the region of patient residence. Patients typically receive service for less complex types of care in their region of residence. For more complex types of service, or for services that require the care of subspecialists who are concentrated in a small number of sites within the province, patients may be required to travel to a neighbouring region, or to a single provincial resource site. Therefore, patient flow patterns tend to follow the existing distribution of centres of capacity and capability to deliver the required services

DISTRIBUTIONAL ACCESS TO SERVICES

Distributional access to services is measured through analysis of RIWs received by patients in different regions. This allows for comparison of access to clinical services for patients across New Brunswick. The rates of access are adjusted to accommodate the age and sex differences of different region populations. For overall hospital care, Figure 4 shows results of the distributional access analysis.

Figure 4: Overall Access Analysis Using 1999/2000 Information

Region	RIW	Age, Sex & SES Standardized RIW	Ratio of RIW to Age, Sex & SES Standardized RIW
1	33,402	33,589	0.99
2	30,316	36,299	0.84
3	31,256	30,967	1.01
4	11,043	10,665	1.04
5	7,956	6,531	1.22
6	16,541	15,519	1.07
7	11,472	9,890	1.16

This analysis shows that there is indeed variation in service provision to the regions in New Brunswick. The relative rate of service provision is calculated by comparing the RIW to the Age, Sex, and Socio-economic (SES) Standardized RIW. The socio-economic adjustments include the premature death rate (the proportion of death in the population under the age of 75), as well as the proportion of low-income households. The ratio illustrates that Region 5 has the highest utilization of service in the province (22% above the provincial average of 1.00) and Region 2 has the lowest utilization (16% below the average of 1.00).

Overall, there is increased use of hospital resources per capita in Regions 5 and 7, and lower use per capita in Region 2. This may be partly explained by the commonly observed phenomenon of increased use of hospital services in more rural regions, where other health services may not be available to substitute for institution-based care. Results of access analyses for specific clinical programs are provided in Chapter 6.

HOSPITAL UTILIZATION PARAMETERS

Hospital utilization parameters are helpful in providing historical information about the degree of service provided to patients, regardless of the population being served. Analysis of bed census reflects the number of patient days provided to patients, accounting for the unpredictable ebb and flow of patients in and out of hospital.

BED CENSUS ANALYSIS

In the past, beds have generally been the currency used to describe hospital census capacity. Although the number of patients being cared for in a hospital fluctuates on an hourly, daily, weekly, monthly, and annual basis, hospitals ought to be able to respond to the varying demand for services, by having in place the capacity (generally beds) to appropriately care for patients.

Rather than report nominal numbers of “funded” beds for individual institutions, we analyzed the actual numbers of patients in each institution on every day. This enabled developing an accurate picture of how many patients were actually admitted within the hospital on any given day. The distribution of patients by program provides a detailed portrayal of how many and what kinds of patients are within each hospital at any given time. In addition, similar analyses of the number of day-surgery patients were conducted for all hospitals, providing a tally of the number of day surgery patients within each institution for every weekday.

Results from the bed census analysis are presented in Figures 5A through 5E. Figure 5A shows the total average bed census by facility and by region, as well as 25th, 50th, and 75th percentiles. Also provided is the ELOS-adjusted Bed Census, which takes into account efficiencies in length of stay at the national benchmark.

Figures 5A to 5F exclude DVA cases. Figure 5F show census by level of care.

Figure 5A: Overall Bed Census Results (1999/2000)

Hospital Name	Region	Total Average Bed Census	25th percentile	Median	75th percentile	Relative LOS Factor	ELOS Adjusted Bed Census	Decentralized CMG census	Regional CMG census	Centralized CMG census
Dr. Georges L. Dumont Hospital	1B	270	252	273	292	1.09	247	126	130	14
Stella-Mari-de-Kent Hospital	1B	18	16	18	19	1.10	16	13	5	0
Region 1B Total		288	268	291	311	1.09	263	139	135	14
The Moncton Hospital	1SE	364	349	370	392	1.09	337	141	256	21
Sackville Memorial Hospital	1SE	18	15	18	20	0.95	19	11	7	0
Albert County Hospital	1SE	2	1	2	2	0.94	2	1	1	0
Region 1SE Total		388	365	390	414	1.09	357	153	214	21
Saint John Regional Hospital	2	430	412	433	454	1.09	394	160	207	62
St. Joseph Hospital (Saint John)	2	55	52	54	57	0.65	85	19	36	0
Charlotte County Hospital (St. Stephen)	2	46	43	46	49	1.00	46	35	11	0
Sussex Health Centre	2	28	24	28	32	1.06	26	21	7	0
Grand Manan Hospital	2	6	4	6	7	1.00	6	3	3	0
Region 2 Total		564	535	567	599	1.04	543	238	263	62
Dr. Everett Chalmers Regional Hospital	3	308	290	311	329	1.02	302	137	165	4
The Carleton Memorial Hospital (Woodstock)	3	46	42	47	51	1.00	46	30	16	0
The Oromocto Hospital	3	36	33	36	39	0.92	39	24	12	0
Hôtel Dieu de St. Joseph (Perth-Andover)	3	33	30	33	37	1.01	33	22	11	0
Northern Carleton Hospital (Bath)	3	19	17	19	21	0.92	21	14	3	0
Queens North Hospital (Miramichi)	3	9	7	9	11	0.94	10	7	2	0
Tobique Valley Hospital (Plaster Rock)	3	7	5	7	8	0.95	7	5	1	0
Region 3 Total		458	424	462	496	0.98	457	239	213	6
Edmundston Regional Hospital	4	145	133	144	158	1.07	135	64	78	1
Grand Falls General Hospital	4	26	22	27	30	1.03	25	17	9	0
Hôtel Dieu de St. Joseph (Saint-Quentin)	4	7	5	7	9	0.88	8	5	2	0
Region 4 Total		177	160	178	197	1.06	168	87	89	1
Campbellton Regional Hospital	5	121	112	123	131	1.11	109	71	50	0
St. Joseph Hospital (Dalhousie)	5	35	33	36	39	1.06	33	28	7	0
Region 5 Total		156	145	159	170	1.09	142	99	57	0
Bathurst Regional Hospital	6	179	169	180	191	1.08	166	85	92	1
Centre Hospitalier de Tracadie	6	47	42	47	53	1.10	43	32	15	0
Centre Hospitalier de Caraquet	6	33	29	33	37	1.06	31	22	11	0
Centre Hospitalier de L'Annapolis	6	8	7	8	10	0.99	8	7	1	0
Region 6 Total		267	247	268	291	1.08	247	146	118	1
Niamechin Regional Hospital	7	140	132	140	149	1.04	134	78	62	0
Region 7 Total		140	132	140	149	1.04	134	78	62	0

Figure 5B: Day Surgery Average Weekday Cases (1999/2000)

Hospital Name	Region	Total Average Bed Census	Average Weekday Day Surgery Cases	25th Percentile	Median	75th Percentile
Dr. Georges L. Dumont Hospital	1B	270	32	26	33	40
Stella-Mars-de-Kent Hospital	1B	18	0	0	0	0
Region 1B Total		288	32	26	33	40
The Moncton Hospital	1SE	368	37	32	37	44
Sackville Memorial Hospital	1SE	18	1	0	0	0
Albert County Hospital	1SE	2	0	0	0	0
Region 1SE Total		388	38	32	37	44
Saint John Regional Hospital	2	430	26	22	27	33
St. Joseph Hospital (Saint John)	2	55	21	16	21	28
Charlotte County Hospital (St. Stephen)	2	46	2	0	1	2
Sussex Health Centre	2	28	3	2	3	4
Grand Manan Hospital	2	6	0	0	0	0
Region 2 Total		564	51	40	52	67
Dr. Everett Chalmers Regional Hospital	3	308	18	14	18	23
The Carleton Memorial Hospital (Woodstock)	3	46	4	3	4	6
The Oromocto Hospital	3	36	16	11	16	21
Hôtel Dieu de St. Joseph (Perth-Andover)	3	33	3	1	3	4
Northern Carleton Hospital (Bath)	3	19	1	0	0	0
Queens North Hospital (Minto)	3	9	0	0	0	0
Tobique Valley Hospital (Plaster Rock)	3	7	0	0	0	0
Region 3 Total		458	42	29	41	53
Edmundston Regional Hospital	4	145	9	4	7	12
Grand Falls General Hospital	4	26	2	0	2	3
Hôtel Dieu de St. Joseph (Saint Quenun)	4	7	0	0	0	0
Region 4 Total		177	11	4	9	15
Campbellton Regional Hospital	5	121	6	4	6	9
St. Joseph Hospital (Dalhousie)	5	35	0	0	0	0
Region 5 Total		156	6	4	6	9
Bathurst Regional Hospital	6	179	8	5	8	11
Centre Hospitalier de Tracadie	6	47	0	0	0	0
Centre Hospitalier de Caraquet	6	33	1	0	1	2
Centre Hospitalier de Lameque	6	8	0	0	0	0
Region 6 Total		267	10	5	9	13
Miramichi Regional Hospital	7	140	7	4	7	9
Region 7 Total		140	7	4	7	9

Figure 5C: Bed Census Results for Family Practice and other Core Programs 1999/2000)

Hospital Name	Region	Total Average Bed Census	Family Practice	General Surgery	Obstetrics/ Gynaecology	Cardiology	Psychiatry
Dr. Georges L. Dumont Hospital	1B	270	120	24	13	16	21
Stella-Mars-de-Kent Hospital	1B	18	15	0	0	0	1
Region 1B Total		288	135	24	13	17	21
The Moncton Hospital	1SE	368	178	26	20	17	31
Sackville Memorial Hospital	1SE	18	14	0	0	1	1
Albert County Hospital	1SE	2	1	0	0	0	0
Region 1SE Total		388	193	27	20	18	33
Saint John Regional Hospital	2	430	186	34	25	25	23
St. Joseph Hospital (Saint John)	2	55	42	1	0	0	3
Charlotte County Hospital (St. Stephen)	2	46	35	2	0	3	2
Sussex Health Centre	2	28	19	2	0	3	1
Grand Manan Hospital	2	6	5	0	0	0	0
Region 2 Total		564	288	39	26	32	28
Dr. Everett Chalmers Regional Hospital	3	308	142	26	22	15	33
The Carleton Memorial Hospital (Woodstock)	3	46	28	3	4	5	1
The Oromocto Hospital	3	36	27	1	0	2	1
Hôtel Dieu de St. Joseph (Perth-Andover)	3	33	20	3	3	2	4
Northern Carleton Hospital (Bath)	3	19	13	1	0	2	1
Queens North Hospital (Minto)	3	9	7	0	0	1	0
Tobique Valley Hospital (Plaster Rock)	3	7	5	0	0	0	1
Region 3 Total		458	241	33	29	27	40
Edmundston Regional Hospital	4	145	78	12	8	8	14
Grand Falls General Hospital	4	26	18	2	3	1	1
Hôtel Dieu de St. Joseph (Saint Quenun)	4	7	5	0	0	1	0
Region 4 Total		177	101	14	11	10	15
Campbellton Regional Hospital	5	121	67	12	7	6	16
St. Joseph Hospital (Dalhousie)	5	35	25	1	0	2	4
Region 5 Total		156	92	13	7	8	20
Bathurst Regional Hospital	6	179	92	17	10	11	20
Centre Hospitalier de Tracadie	6	47	36	3	0	1	2
Centre Hospitalier de Caraquet	6	33	23	2	4	1	1
Centre Hospitalier de Lameque	6	8	7	0	0	0	0
Region 6 Total		267	158	21	14	13	23
Miramichi Regional Hospital	7	140	83	10	10	11	9
Region 7 Total		140	83	10	10	11	9

Figure 5D: Bed Census Results for Specialized Programs (1999/2000)

Hospital Name	Region	Total						
		Average Bed Census	Orthopaedic Surgery	Urology	Plastic Surgery	Vascular Surgery	Otolaryngology	Haematology
Dr. Georges L. Dumont Hospital	1B	270	17	9	2	10	4	8
Stella-Maris-de-Kent Hospital	1B	18	0	1	0	0	0	1
Region 1B Total		288	17	10	2	10	4	9
The Moncton Hospital	1SE	368	19	5	6	12	2	13
Sackville Memorial Hospital	1SE	18	0	0	0	0	0	0
Albert County Hospital	1SE	2	0	0	1	0	0	0
Region 1SE Total		388	19	6	7	12	2	13
Saint John Regional Hospital	2	430	27	11	4	11	3	12
St. Joseph Hospital (Saint John)	2	55	1	1	0	4	0	1
Charlotte County Hospital (St. Stephen)	2	46	0	2	0	0	0	0
Sussex Health Centre	2	28	0	0	0	0	0	0
Grand Manan Hospital	2	6	0	0	0	0	0	0
Region 2 Total		564	28	14	4	16	3	13
Dr. Everett Chalmers Regional Hospital	3	308	21	9	6	8	3	4
The Carleton Memorial Hospital (Woodstock)	3	46	2	1	0	0	0	0
The Oromocto Hospital	3	36	1	0	0	0	0	0
Hôtel Dieu de St. Joseph (Perth-Andover)	3	33	0	1	0	0	0	0
Northern Carleton Hospital (Bath)	3	19	0	0	0	0	0	1
Queens North Hospital (Minto)	3	9	0	0	0	0	0	0
Tobique Valley Hospital (Plaster Rock)	3	7	0	0	0	0	0	0
Region 3 Total		458	24	11	7	9	4	5
Edmundston Regional Hospital	4	145	7	2	1	4	1	2
Grand Falls General Hospital	4	26	0	0	0	0	0	1
Hôtel Dieu de St. Joseph (Saint-Quentin)	4	7	0	0	0	0	0	0
Region 4 Total		177	8	3	1	4	1	2
Campbellton Regional Hospital	5	121	3	3	1	1	0	1
St. Joseph Hospital (Dalhousie)	5	35	0	1	0	0	0	1
Region 5 Total		156	4	4	1	1	0	2
Bathurst Regional Hospital	6	179	6	5	2	1	3	2
Centre Hospitalier de Tracadie	6	47	0	1	0	0	0	1
Centre Hospitalier de Caraquet	6	33	0	0	0	0	1	1
Centre Hospitalier de Lameque	6	8	0	0	0	0	0	0
Region 6 Total		267	7	7	3	1	4	4
Miramichi Regional Hospital	7	140	6	4	1	1	1	1
Region 7 Total		140	6	4	1	1	1	1

Figure 5E: Bed Census Results for Provincial Programs (1999/2000)

Hospital Name	Region	Total Average Bed Census					Cardiovascular Surgery
		Thoracic Surgery	Nephrology	Neurosurgery	Neonatology		
Dr. Georges L. Dumont Hospital	1B	270	4	12	2	2	0
Stella-Maria-de-Kent Hospital	1B	18	0	0	0	0	0
Region 1B Total		288	4	12	2	2	0
The Moncton Hospital	1SE	368	4	2	16	13	0
Sackville Memorial Hospital	1SE	18	0	0	0	0	0
Albert County Hospital	1SE	2	0	0	0	0	0
Region 1SE Total		388	4	2	16	13	0
Saint John Regional Hospital	2	430	6	7	17	11	17
St. Joseph Hospital (Saint John)	2	55	0	0	0	0	0
Charlotte County Hospital (St. Stephen)	2	46	0	1	0	0	0
Sussex Health Centre	2	28	0	1	0	1	0
Grand Manan Hospital	2	6	0	0	0	0	0
Region 2 Total		564	7	9	17	12	17
Dr. Everett Chalmers Regional Hospital	3	308	4	2	2	9	0
The Carleton Memorial Hospital (Woodstock)	3	46	0	0	0	0	0
The Oromocto Hospital	3	36	0	0	1	1	0
Hôtel Dieu de St. Joseph (Perth-Andover)	3	33	0	0	0	0	0
Northern Carleton Hospital (Bath)	3	19	0	0	0	0	0
Queens North Hospital (Minto)	3	9	0	0	0	0	0
Tobique Valley Hospital (Plaster Rock)	3	7	0	0	0	0	0
Region 3 Total		458	4	3	4	10	0
Edmundston Regional Hospital	4	145	1	3	1	2	0
Grand Falls General Hospital	4	26	0	0	0	0	0
Hôtel Dieu de St. Joseph (Saint-Quentin)	4	7	0	0	0	0	0
Region 4 Total		177	1	3	2	2	0
Campbellton Regional Hospital	5	121	0	1	1	1	0
St. Joseph Hospital (Dalhousie)	5	35	0	0	0	0	0
Region 5 Total		156	0	1	1	1	0
Bathurst Regional Hospital	6	179	1	2	1	4	0
Centre Hospitalier de Tracadie	6	47	0	0	0	0	0
Centre Hospitalier de Caraquet	6	33	0	0	0	0	0
Centre Hospitalier de Lamèque	6	8	0	0	0	0	0
Region 6 Total		267	1	2	1	4	0
Miramichi Regional Hospital	7	140	0	1	2	1	0
Region 7 Total		140	0	1	2	1	0

Figure 5F: Bed Census Results by Level of Care (1999/2000)

Hospital Name	Region	Total Average Bed Census		Chronic/ Extended Care		Rehabilitation
			Acute			
Dr. Georges L. Dumont Hospital	1B	270	202	68		0
Stella-Mans-de-Kent Hospital	1B	18	18	0		0
Region 1B Total		288	220	68		0
The Moncton Hospital	1SE	368	314	43		11
Sackville Memorial Hospital	1SE	18	18	0		0
Albert County Hospital	1SE	2	2	0		0
Region 1SE Total		388	334	43		11
Saint John Regional Hospital	2	430	398	18		14
St. Joseph Hospital (Saint John)	2	55	3	51		0
Charlotte County Hospital (St. Stephen)	2	46	32	14		0
Sussex Health Centre	2	28	28	0		0
Grand Manan Hospital	2	6	6	0		0
Region 2 Total		564	467	83		14
Dr. Everett Chalmers Regional Hospital	3	308	270	18		19
The Carleton Memorial Hospital (Woodstock)	3	46	46	0		0
The Oromocto Hospital	3	36	19	17		0
Hôtel Dieu de St. Joseph (Perth-Andover)	3	33	33	0		0
Northern Carleton Hospital (Bath)	3	19	19	0		0
Queens North Hospital (Minto)	3	9	9	0		0
Tobique Valley Hospital (Plaster Rock)	3	7	7	0		0
Region 3 Total		458	403	35		19
Edmundston Regional Hospital	4	145	110	35		0
Grand Falls General Hospital	4	26	26	0		0
Hôtel Dieu de St. Joseph (Saint-Quentin)	4	7	7	0		0
Region 4 Total		177	143	35		0
Campbellton Regional Hospital	5	121	113	8		0
St. Joseph Hospital (Dalhousie)	5	35	35	0		0
Region 5 Total		156	149	8		0
Bathurst Regional Hospital	6	179	153	27		0
Centre Hospitalier de Tracadie	6	47	38	9		0
Centre Hospitalier de Caraquet	6	33	33	0		0
Centre Hospitalier de Lameque	6	8	8	0		0
Region 6 Total		267	232	35		0
Miramichi Regional Hospital	7	140	140	0		0
Region 7 Total		140	140	0		0

Adjustments made in light of national length of stay benchmarks account for variation in institutions' length of stay per typical case, but do not consider variations in hospital admissions per capita. Analysis of New Brunswick's hospital utilization, for example when compared to Ontario and Nova Scotia, shows that there is considerable room for improvement in current bed utilization. Hence, bed requirements must be considered as measures of current utilization, prior to implementation of strategies to improve the appropriateness of acute hospitalization (e.g., by reducing the use of acute hospital days for long-stay cases).

SUSTAINABILITY CRITERIA

Of primary concern to all stakeholders in the health care system in New Brunswick is the sustainability of health care delivery resources, particularly in smaller facilities. These concerns are expressed in terms of the ability to recruit and retain physicians and nurses, and the availability of adequate funding. As previously discussed, a starting point for considering sustainability of any clinical program in a given care setting is that the program must fulfill some basic criteria, including:

- The program must be available when needed. For acute hospital services, this usually means that the program must be available on a continual basis to meet urgent and emergent needs.
- The program must be staffed by physicians, nurses, and other health professionals at an adequate level to provide on-call coverage and 24-hour inpatient care.

- The program must be supported by infrastructure services and facilities to enable its continuous availability.
- The program must be affordable. This means that a critical mass of cases and/or patients is required to acquire and maintain the necessary infrastructure.
- The program must be stable and hence able to withstand the loss of key individual personnel.

These underscore the fact that the sustainability of programs is a factor of two components, availability of skilled health care providers, and adequate population base to sustain adequate volumes of appropriate cases. Therefore, these criteria can be used to evaluate sustainability of clinical programs. Analysis of physician FTEs who currently provide service in hospitals is shown for specific clinical programs in Chapter 6. The number of physician FTEs required at each hospital is calculated based upon the total program load and the mean number of cases cared for by physicians. Generally, larger hospitals, drawing on larger populations, have higher average RIW caseloads for specialists.

INTEGRATION PARAMETERS AND MEASURES

The purpose of tools for integration parameters and measures is to gather information on how we would know we were in an integrated hospital system. These tools try to measure the concepts presented in Chapter 4, which describe a coordinated, patient-centred system of care. The following analyses are used to understand the degree of integration required for clinical programs in New Brunswick.

Clustering of programs: Integration parameters for clinical programs include the clustering of programs for maximized efficiency, quality, access, and sustainability. For example, clinical programs such as trauma need to involve emergency medicine, neurosurgery, orthopaedics, general surgery, and other programs to be effective.

Transfer rates: When a hospital system is working most effectively, it uses the right kind of resource at the right time for the right patient. Therefore, specialized care should be given to patients for only the brief amount of time for which they require it and lower intensity convalescent care should be given when appropriate. This maximizes the use of human and financial resources and improves the quality of care. Transfer rates may capture some of this appropriate triaging and placement of patients throughout the hospital system. Since present rates of transfer between facilities in New Brunswick are static and tend to be low, this measure should be appropriately monitored in the future as an indicator of integration.

SCENARIO ANALYSIS

For each program, we considered the existing distribution of service, the flow of patients between regions of residence and RHCs, and the distance travelled by patients to receive service. Program distribution scenarios were created, whereby sustainable volumes of program service were sited within facilities that currently provided a minimum threshold of the service. Further, patients who currently received care at facilities that were not included in a particular scenario were deemed to travel to the nearest centre included in the scenario.

The current distribution at all hospital sites with greater than 100 to 300 weighted cases (the threshold depends on the program) was examined. Since for most programs, the RIW equivalent for a single FTE physician was of the order of 200 to 300, this threshold was chosen.

After review of the base distribution among regional hospitals, additional siting options were reviewed, for consolidation of programs at larger or accessible sites. In these scenarios, all program cases were maintained at sites where the program was maintained. In addition, cases from other hospitals with non-sustainable caseloads were redistributed to the nearest hospital with an existing program if they were among CMGs categorized as "Centralized" or "Regional", or if they are in "Decentralized" CMG cases that were cared for by physician specialists.

Physician FTE equivalents required at each hospital were calculated based on the total program RIW load at each site and the mean number of cases cared for by program specialist physicians at redistribution sites. Generally, larger hospitals drawing on larger populations had higher average RIW caseload for specialists.

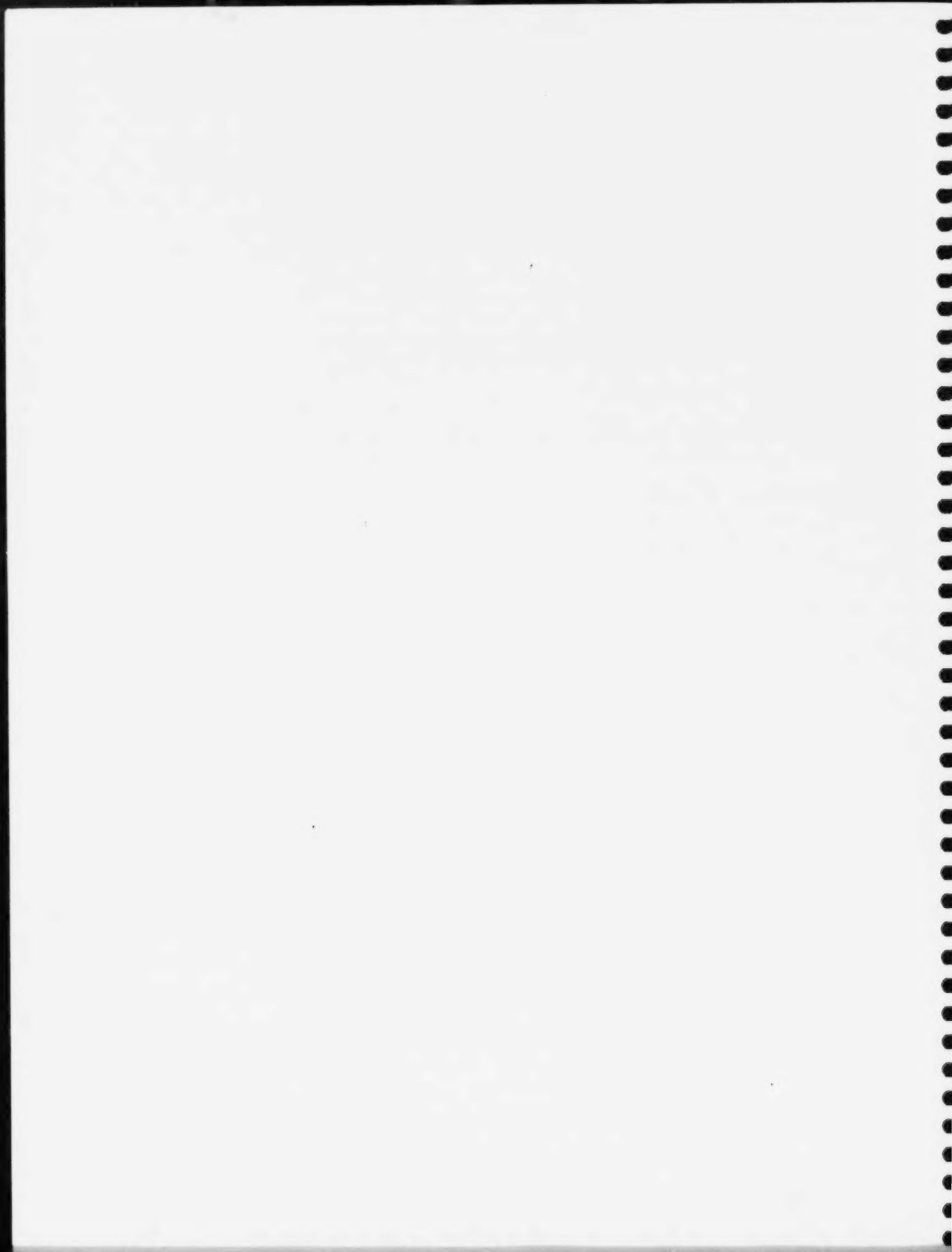
FACILITATING ANCILLARY SERVICES

Each program (or cluster of programs) needs clinical support from numerous medical and other professional human resources (e.g., anaesthesiologists, rehabilitation professionals), in addition to facilities (e.g., Operating Rooms, Laboratory, Diagnostics).

Phase IIB of the CPD report could focus in more detail on these services in addition to the size and staffing requirements for Emergency Departments.

The review of Emergency Departments should proceed from two perspectives.

- First, a high-level population analysis based on the number of expected Emergency Department visits per capita per year could be done for New Brunswick Health Regions. The expected number of visits to Emergency Departments, combined with the distribution of the population, distances from current Emergency facilities, and average workloads for Emergency Department staff allow planning for the distribution of Emergency care within current facilities.
- In addition, it will be important to specify the formal integration of emergency services, including ambulance, triage, and Emergency Departments across the province to ensure access and safe delivery of care.

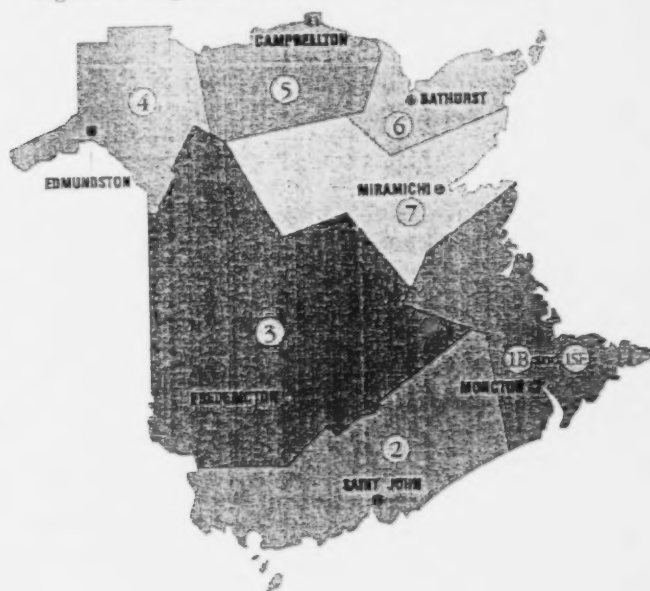


CHAPTER 6: FINDINGS AND ANALYSIS

INTRODUCTION: A HOSPITAL SYSTEM MODEL FOR NEW BRUNSWICK

Traditional hospital system planning in New Brunswick has been done on a regional basis. The boundaries of New Brunswick's eight regions are shown on the map below.

Figure 6: Regional Model for Hospital Planning



These health regions have been useful in defining Region Hospital Corporations and the newer Regional Health Authorities, with specific boundaries for health service provision. However, planning hospital services for the citizens of the province must not stop at regional boundaries. For many clinical programs delivered within the hospital system, the size of the population in many individual regions cannot support the existence of a freestanding clinical program. Indeed, for some programs, a single provincial hospital resource makes the most sense. As such, cooperation among many of the regions, both in planning and in delivering service, is necessary to sustain a system of hospital care in the province that is viable and best suited to deliver accessible and high-quality services.

The CPD Group has taken the approach that clinical programs are the building blocks of the hospital system. The combination and number of programs offered at individual hospitals will vary within the province. Analyzing what programs ought to be in which kinds of hospitals is the main purpose of this chapter.

In the first section, the spectrum of clinical programs is outlined, defining the basic categories of clinical programs for the province. In the next section, individual clinical programs are analyzed, using the tools

CHAPTER 6: FINDINGS AND ANALYSIS

INTRODUCTION: A HOSPITAL SYSTEM MODEL FOR NEW BRUNSWICK

Traditional hospital system structures in New Brunswick have been based on a regional basis. The structure of New Brunswick's eight regions and the major hospitals are shown in Figure 6.

Figure 6: Regional Model for Hospital Planning



These health regions have been used in defining Region Hospital Corporations and the newer Regional Health Authorities, with specific boundaries for health service provision. However, planning hospital services for the citizens of the province must not stop at regional boundaries. For many clinical programs delivered within the hospital system, the size of the population in most individual regions cannot support the existence of a free-standing clinical program. Indeed, for some programs, a single provincial hospital resource makes the most sense. As such, co-operation among members of the system, both in planning and in delivering services, is necessary to sustain a system of hospital care in the province that is capable and best suited to deliver accessible and high-quality services.

The CPD Group has taken this approach to clinical programs as the building blocks of the hospital system. The combination and number of programs served at individual hospitals will vary within the province. Analyzing what programs ought to be at each hospital is beyond the main purpose of this chapter.

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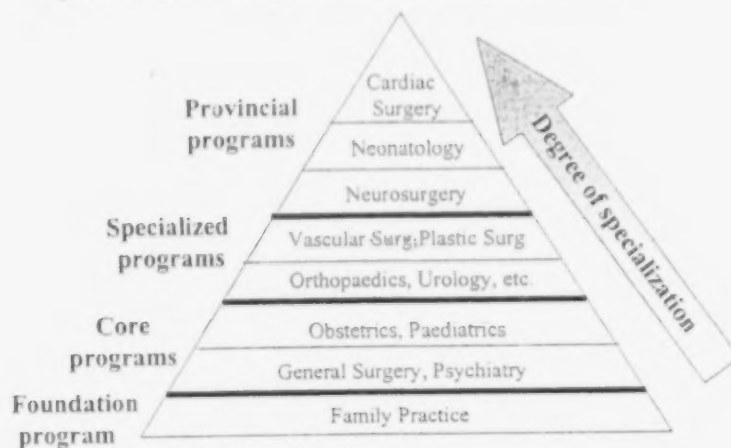
described in Chapter 5. Then, because planning hospital services based on clinical programs is best done when the relationships between them are taken into account, the programs that cluster together are discussed.

Finally, the building of the hospital system through clinical programs culminates with a type of classification of hospitals – ranging from those with only a few programs and those with many. This hospital network is discussed in detail as a prospective planning tool.

SPECTRUM OF CLINICAL PROGRAMS

Clinical programs within hospitals span a spectrum, from those services that can be delivered at most hospitals with inpatient beds to those that are available at only one or a few facilities within the province. The spectrum of such services is categorized according to the relative distribution of these programs and the concentration of human and other resources required to sustain the programs.

Figure 7: Clinical Program Model for Hospital Planning



There are four basic categories of clinical programs. The foundation program for all hospitals with inpatient beds is the Family Practice program, which is the largest program in the province. It is primarily covered by Family Practitioners, with significant contribution at some sites from General Internists, as well as other Internal Medicine and Surgical Specialists.

Core Programs are those programs that exist, in one form or another, at all the regional hospitals. In some cases, these programs may not be sustainable in regional hospitals serving smaller populations, unless inter-regional cooperation in planning and maintaining the programs is undertaken. These programs include General Surgery, Obstetrics/Gynaecology, Paediatrics, and Psychiatry.

The third tier of programs, Specialized Programs, is typically unsustainable at every regional hospital, especially those serving smaller population areas. Some of these programs may be sited at only three or four primary sites, requiring the cooperation of aggregations of RHAs in delivering these clinical programs to their constituent populations. Some specialized programs are currently at risk in New Brunswick because of recruitment and retention of human resources (e.g., physicians and other clinical support). Examples of Specialized Programs include Orthopaedics, Urology, and Vascular Surgery.

Finally, Provincial Programs are those programs that must be sited in one or at most two sites. These programs are highly specialized and require a large population base to support the size of program that meets sustainability and/or quality criteria. Examples include Cardiac Surgery and Invasive Cardiology, Neonatology for high-risk infants, and Neurosurgery.

In the next section, we review each of the programs within these four categories. For each program above 1,000 RIW for the province, the results of the following analyses are described:

- CMGs within the program;
- variation in utilization rates across regions;
- physician FTEs for each hospital in this program;
- bed census analysis; and
- current distribution and potential scenarios for redistribution.

Of note, the activities of a number of specialties have not been addressed in this detail. For example, the inpatient and day surgery activity in rheumatology, dentistry, infectious disease, anaesthesiology, endocrinology, gerontology, and dermatology has not been analyzed as above due to the relatively small number of cases for which the program specialists were the most responsible physicians. This does not indicate that these are not important programs. Rather, their activity ought to be individually planned in conjunction with their representative stakeholder groups, after the basic structure of individual and networked hospitals is established. Analysis of outpatients visits for some specialties not covered in depth within this report is provided in Appendix C.

INDIVIDUAL PROGRAM REVIEW

Discussion of all programs in the following sections is based on detailed analyses conducted by the CPD group. Results of these analyses are contained in Appendix C.

FOUNDATION PROGRAM - FAMILY PRACTICE

The Family Practice program in New Brunswick consists largely of common, relatively low complexity CMGs, many of which may be treated in a community hospital without the requirement for transfer. The most common regional CMGs include Chronic Obstructive Pulmonary Disease, and diagnoses related to surgery, obstetrics/neonatology, and dementia. Decentralized CMGs are mainly general digestive disease, pneumonia, and heart failure.

As is expected, the vast majority of family practice cases, by virtue of their ubiquity in acute hospital practice, is treated close to home and is contained within each region. The variation in per capita utilization follows well-documented patterns of lower complexity hospital utilization in rural regions.

Family Practitioners form the backbone of the hospital care system. Most community hospitals have an adequate complement of family physicians to form hospital and emergency department call groups. The rural hospitals, with fewer than five available physicians active in hospitals to provide inpatient and emergency department service, may experience difficulty in maintaining fully operational emergency departments at all times. The role of Family Practitioners may vary based on the type of hospital, where rural hospitals may depend on

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Family Practitioners for almost all care provided, while regional hospitals may rely increasingly on specialists for care provision.

The provincial average weighted cases among hospital-active family practitioners is 190, of which 165 are within the Family Practice program. The other practitioners who provided more than the program threshold service in the Family Practice program were primarily Paediatricians, General Surgeons, Internists, Gastroenterologists, and Cardiologists.

CONCLUSIONS:

The Family Practice program accounts for almost half the bed census of the largest four regional hospitals, more than half the bed census for the remaining regional hospitals, and the vast majority of beds within smaller hospitals. Trends in Family Practice towards non-hospital based practice may affect these bed census numbers, but the prevalence of Family Practice in all types of hospitals in New Brunswick will likely mitigate against decreases in the short- to medium-term. It is anticipated that most hospitals, other than the existing regional hospitals, would have only Family Practice as a full program. Family Practice may be augmented with additional support from Obstetrics or itinerant General Surgery through linkage with a regional hospital's Obstetrics and General Surgery programs.

CORE REGIONAL PROGRAMS

GENERAL SURGERY

The New Brunswick General Surgery program consists mostly of major intestinal and rectal procedures, gastrostomy and colostomy procedures, laparotomies, cholecystectomies, and hernia procedures. Most New Brunswickers are treated for their General Surgery needs at hospitals in their region of residence. There is considerable variation in the regional utilization of General Surgery services. Region 5 has a utilization rate 37% higher than the provincial average, while Region 2 has a utilization rate 15% below the provincial average. The high relative utilization in Region 5 was addressed in the CPD Group's Phase I report, and was attributed to a high rate of a specific surgical procedure at a single institution.

There were 36 General Surgeons with greater than 100 RIWs in New Brunswick in 1999/2000. At some sites, a significant proportion of the General Surgery program was delivered by other specialists (notably Thoracic and Vascular Surgeons at The Moncton Hospital and Dr. Everett Chalmers Hospital). In addition to caring for patients hospitalized specifically for general surgery needs, General Surgeons often participate in the care of patients who were hospitalized for other needs. Ontario's General Surgeons participate in the care of a large percentage of patients cared for primarily by other types of specialists. For example, General Surgeons participated in the care of 19% of Ontario's Nephrology program RIWs, and 17% of Ontario's Haematology RIWs, in addition to high participation rates in several other programs.

Given how often General Surgeons play a supporting role to other programs, it is necessary for any hospital that is considered a site for other specialized programs to have an established General Surgery program. For example, in Ontario, internists and family practitioners each participate in the care of approximately 25% of General Surgery's RIWs. In view of these key relationships, General Surgery, Family Practice, and some degree of Cardiology are to be expected as the basis for hospitals offering services beyond the scope of the Family Practice Program.

The General Surgery Program accounts for between 24 and 34 beds at the large regional hospitals, 17 beds at Bathurst Regional Hospital and 10 to 12 beds at the remaining northern regional hospitals. It accounts for a bed census of less than three at all remaining hospitals.

Analysis of the average driving distances to hospital for general surgery services reveals that geographic access to general surgery is excellent in the current system for all regions. The regional average road distance from the patient's home to the hospital where they received general surgery ranges from 18 km in Region 1 to 54 km in Region 6. The provincial average is 32 km. However, in the distribution of General Surgery to all regional hospitals, it remains that Regions 4, 5, and 7 are at or below the expected complement of three FTEs, and Region 5 has high per capita surgery rates which may not be sustained in future.

When considering the planning principles adopted by the CPD Group, there are a number of reasons to consolidate some of New Brunswick's general surgery programs. Perhaps the most compelling factors supporting the consolidation at least at the regional hospitals are the principles of sustainability and efficiency. General Surgery programs that currently have only one, or even no, General Surgeons operating above the minimum threshold annual RIW caseload will likely struggle to replace General Surgeons if they leave or retire, and do not have an adequate referral population to efficiently support a General Surgery program or to recruit additional surgeons.

Scenario analysis performed for the General Surgery program demonstrates that many general surgery programs could be consolidated without adversely affecting New Brunswickers' geographic access to general surgery services. If Dr. Georges Dumont Hospital, The Moncton Hospital, Saint John Regional Hospital, Dr. Everett Chalmers Hospital (the "base" regional hospitals), and Bathurst Regional Hospital were to offer General Surgery programs, general surgery patients would have to travel an average of 54 km to receive service, with patients from Region 4 averaging 215 km.

Another option considered is to offer general surgery at the base hospitals, Bathurst Regional Hospital and Edmundston Regional Hospital. Under this configuration, patients would travel a provincial average of 41 km for service, with the average for no individual region being unreasonable. It is important to note that this scenario is not intended to be interpreted as a strict set of parameters. Rather, it suggests that minimum critical program size can be achieved only through aggregation of the program among the northern regions (Regions 5, 6, and 7) and that the small program at Edmundston Regional Hospital ought to be paired with Region 3 for joint planning and maintenance.

Finally, pancreatic resections for neoplasm are procedures for which associations between better outcome and hospital volume have been repeatedly demonstrated (Nuffield 1996, Sosa 1998, Simunovic 1999, Dudley 2000). The annual volume thresholds of below three for low volume hospitals and greater than six for high volume hospitals is consistent in the Dudley and Simunovic studies. The procedure volumes (definitions consistent with Simunovic 1999) in New Brunswick hospitals are shown in Figure 8. Annual volumes are 4 at the Moncton and Saint John Regional Hospitals and 2 at the Dr. Georges Dumont hospital. Hence, referral for these pancreatic procedures ought to be planned with the objective of meeting minimal annual volumes of more than 6 procedures per year.

Figure 8: Annual volumes of pancreatic resection for neoplasm at New Brunswick Hospitals

Hospital	1997/98	1998/99	1999/2000	Annual Mean
Dr. Georges L. Dumont Hospital	3	1	2	2
The Moncton Hospital	5	2	6	4
Saint John Regional Hospital	3	3	6	4

CONCLUSIONS

For the General Surgery program, formal planning of the distribution of service to the population of Regions 5, 6, and 7, as well as of Regions 3 and 4 may be done jointly by these inter-regional aggregates. Siting of program components (e.g., day surgery facilities, subtypes of elective general surgery) would be at the discretion of inter-regional planners, constrained by the need to provide call coverage, ensure the ability to recruit new physicians, and adequate case volumes to justify facility plans. That is, General Surgery services could be delivered in smaller facilities, provided that regional planning initiatives have ensured that sustainability criteria have been met and that appropriate linkages with regional support are planned. Physician collaboration among these regions will be an important goal within the General Surgery program.

For example, the General Surgeons at the Fort Frances Clinic in Fort Frances, Ontario have benefited from involvement in a Surgery Network. This network provides collegial support, continuing medical education, and other networking opportunities for General Surgeons in Kenora, Sault Ste. Marie, Fort Frances, and Dryden (Spencer interview, 2002). This type of support could be offered across regions where educational or collegial support, and shared call coverage and triage mechanisms may currently not be formalized.

OBSTETRICS

Obstetrical services encompass the temporal spectrum of care in the prenatal, peripartum, and postnatal periods, the risk spectrum from low-risk obstetrics to the care and delivery of infants in high-risk pregnancies, and the ability to respond to rapidly evolving urgent and emergent situations.

Planning the distribution of obstetrical services to a population in urban and rural regions imposes the need to balance competing priorities of efficiency, quality, and sustainability with the community need for provision of safe and effective care in local facilities. In addition, obstetrical services planning must be done in conjunction with the planning of neonatal care networks and in light of the availability of general surgery, anaesthesiology, and family practice care on site.

In addition to the examples of the overall hospital classification system presented later in this chapter, certain programs also lend themselves to program-specific classifications. In Obstetrics, traditionally, hospital programs providing obstetrical care are classed according to the levels of care provided. The generally accepted classification system is as follows:

Figure 9: Classification of Levels of Obstetrical Care (Manitoba College of Physicians and Surgeons)

Level of Obstetrical Care	Parameters
Level 0	· No organized elective obstetrics.
Level I Primary Care Centre	· Provides peripartum care for normal pregnancies. · Ideally performs 25 or more deliveries per year. · Ideally has the capacity to perform Caesarean section or have Caesarean section services available within 30 minutes from the determination of the need to do so.
Level II Intermediate Regional Referral Centre	· Meets all Level I requirements. · Meets all considerations of the delivery of the normal to intermediate/high risk pregnancy and care of the neonate. · Ideally performs 250 deliveries per year. · Functionally organized to accept referred patients to a defined level of care.
Level III Tertiary Care Referral Centre	· Meets all Level I and II requirements. · Provides all associated maternal and neonatal surgical and medical services including high risk obstetrical and neonatal services. · Accepts transfers of infants and mothers between facility Levels I and II.

The Society of Rural Physicians of Canada (SRPC) and the Society of Obstetrics and Gynaecology of Canada (SOGC) have issued a joint position paper on rural maternity care in support of appropriate, effective, and safe maternity care for rural communities (1998). The practical definition of rural communities and facilities encompasses attributes of:

- “rural close” facilities within 80 km of urban centers but with a small number of general practitioners and with limited access to specialist resources and high technology health care facilities;
- “rural remote” hospitals and communities ranging from 80 to 400 km from a major regional hospital; and
- “rural isolated” communities more than 400 km or 4 hours transport from a regional hospital.

In New Brunswick, there are no rural isolated communities, only rural close and rural remote hospital programs. The position paper supports maintenance of rural maternity care services in the context of regionalization where women at risk for adverse maternal and/or perinatal outcomes should deliver in centers with the facilities to manage labour and delivery complications.

Obstetrics is primarily a regional service, with deliveries being the key type of CMG in this program. Virtually all specialists in the program are found at the regional hospitals. Obstetrical services are generally well contained within regions. While there is significant inter-regional variation in the provision of Obstetrical services, the birth incidence is not something over which regions have control. However, RHCs may be held accountable for some factors which can affect the RIW per patient (e.g., VBAC rates vs. Caesarean section). These factors should be monitored through ongoing performance monitoring.

Sackville Memorial Hospital and Northern Carleton Hospital (Bath) had few deliveries in 1999/2000. Grand Falls General Hospital, Centre Hospitalier de Caraquet, and Hotel Dieu de St. Joseph (Perth-Andover) hospitals had between 100 and 225 deliveries during that year, with Caesarean section capability. Each of these was staffed by at most one obstetrician. The remaining nine hospitals (the regional hospitals in each RHC plus the Carleton Memorial Hospital (Woodstock)) were above 250 deliveries per year.

Data indicate a net inflow of cases into Bathurst Regional Hospital, Dr. Everett Chalmers Regional Hospital, and The Moncton Hospital. Net outflow (expressed as the actual cases minus cases that are geographically closest to the hospital) was evident for Centre Hospitalier de Caraquet, The Carleton Memorial Hospital (Woodstock), Miramichi Regional Hospital, and the Grand Falls General Hospital.

Less than 60% of cases closest to Centre Hospitalier de Caraquet, Hotel Dieu de St. Joseph (Perth-Andover), Grand Falls General Hospital, and the Carleton Memorial Hospital (Woodstock) are served by that hospital.

Less than 50% of cases in Grand Falls and Caraquet are attended by family physicians. Hence, loss of the single Obstetrician would deplete the program by greater than half the volume, which is already at low levels. For Hotel Dieu de St. Joseph (Perth Andover), there was no obstetrician in 1999/2000. None of these three hospitals is greater than 80 km from the closest regional (Level II or III) hospital, hence would not be considered a rural remote hospital. Thus, it is reasonable to assume that patients could safely deliver at regional hospitals.

Obstetrical services were reviewed in combination with and separate from Gynaecological services. For the combined Obstetrics and Gynaecology program, Regions 5 and 7 are below the threshold number of physician FTEs to be a sustainable program. For regional obstetrics, physician FTEs are below threshold in Regions 1B and 4. Gynaecology is more evenly distributed at the regional hospitals, but is below threshold in Regions 5 and 7. Obstetrics accounts for a census of 20 to 25 at The Moncton Hospital, Saint John Regional Hospital, and Dr.

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Everett Chalmers Regional Hospital. The census at the remaining regional hospitals is between 7 and 13. All other hospitals offering obstetrical care have an average census of less than 4.

The scenario which distributes obstetrics cases to the regional hospitals leaves the Dumont and the four smaller regional hospitals with less than three obstetrician FTEs each. Hence, coordinated planning of obstetrical services on an inter-regional basis, both in terms of coordination of care and to maintain sustainability and support of individual sites offering care, is desirable.

CONCLUSIONS:

For obstetrics, findings from other jurisdictions and literature support the classification of obstetrical services into Levels I, II, and III. The current distribution of obstetrical care in New Brunswick hospitals suggests that there is no need to provide organized obstetrical services at Sackville Memorial Hospital or Northern Carleton Hospital (Bath).

Grand Falls General Hospital, Centre Hospitalier de Caraquet, and Hotel Dieu de St. Joseph (Perth-Andover) currently meet the criteria of Primary Care Centre Level I obstetrical care. High-risk pregnancies in their catchment areas ought to be delivered in Level II or III hospitals. Many elective Caesarean section cases in these hospitals' market share are currently performed at larger facilities; the practice of performing elective Caesarean sections routinely in larger facilities ought to be considered. These hospitals currently have no or one obstetrician. While all the regional hospitals have adequate volumes to meet Level II criteria, programs with less than two or fewer physician FTEs are less sustainable at Level II status due either to a small physician complement or a small case volume. The lower volume regional hospitals' catchment areas are sufficiently small that they would not be expected to support a full complement of three to five obstetricians. Hence, inter-regional planning of obstetric services, in particular the designation of Level II status among the regional centres must be initiated.

However, change to the status of smaller hospital programs has implications. For instance, the loss of a single obstetrician may have implications on the number of family physicians maintaining obstetrical practice without obstetrical backup. This could jeopardize the future obstetrical service in these facilities.

CARDIOLOGY

The Cardiology program in New Brunswick consists largely of a few high volume CMGs (regional and decentralized). Most common are pacemaker implants, unstable angina, chest pain, and acute myocardial infarction (AMI). Most of the RIWs are decentralized.

Patient flow patterns for Cardiology show that patients are almost exclusively treated within their region of origin. There are no significant trends towards leaving the region for service, apart from the provision of care for centralized Cardiology CMGs in Region 2 and pacemaker patients travelling from Regions 6 and 7 to Region 1B. Further, out of province patients are evenly distributed among regions and there are no major discrepancies in the proportion of patients from New Brunswick seeking care out of province.

There is quite significant variation in per capita rates of hospital service among regions for Cardiology. Region 2 has a significant 'underuse' of Cardiology (driven by low utilization of decentralized and regional CMGs). However, this may be due to a corresponding higher utilization of centralized Cardiology and Cardiac Surgery (discussed later in this section). Region 7 shows a higher utilization of Cardiology and Cardiac Surgery services than the average, due to increased burden of illness.

Cardiology is largely a decentralized and regional program cared for by a variety of practitioners, including Family Practitioners, General Internists, other internal medicine specialists, and Cardiologists. While the distribution of Cardiology services to all regional hospitals results in relatively low numbers of FTEs at Regions 4, 5, and 7, it may not be necessary to achieve a minimum of three FTEs per site due to the overlap of clinical practice (for regional Cardiology CMGs) with that of other medical specialists and General Internists. In fact, General Internists provide half of Cardiology program service in Regions 3, 4, 6, and 7. When the Cardiology program is restricted to its Regional and Centralized components, it is clear that there are one or more FTEs only at RHCs 1B, 1SE, 2, 3, and 6.

The four largest regional hospitals have an average census between 16 and 25 beds in Cardiology. The smaller Regional Hospitals and Carleton Memorial have a census of 5 to 11. The remaining hospitals have a census of three or fewer. The cases in the regional hospitals are covered by Family Practitioners, Cardiologists, and other Internists. The overwhelming majority of cases at Campbellton Regional Hospital, Carleton Memorial Hospital, and the smaller hospitals are cared for by Family Physicians.

CONCLUSIONS:

The Cardiology program is expected to remain in all regional hospitals, comprising decentralized and regional CMGs. The care is divided between Family Physicians and Cardiologists (in the larger centres) and other Internal Medicine specialists (this is especially true at the smaller regional centres). While the workload at the smaller regional hospitals is equivalent to that of one full time Cardiologist, the work is usually distributed among four or more internists. Cardiology Program care, primarily in decentralized CMGs, is delivered by Family Physicians at the smaller hospitals, as it is at Campbellton Regional Hospital.

Planning for provincial cardiology services should be based on collaborative planning between Regions 1B and 1SE, Regions 3 and 4, and Regions 5, 6, and 7. Collaboration and planning by these regional groupings would facilitate the establishment of programs that would offer maximal sustainability, efficiency, and quality without unduly affecting New Brunswickers' access to services.

PSYCHIATRY

Psychiatry is a decentralized and regional program encompassing the care of schizophrenia, depressive mood disorders, bipolar mood disorder, and other psychiatric disorders. Psychiatrists provide all care for schizophrenia, and the majority of care for other CMGs within the program.

The great majority of patients admitted for psychiatric causes are treated in their home regions. The rates of admission in Regions 4, 5, and 6 are substantially higher than the New Brunswick average (between 33% and 90% greater), while the rates in Regions 2 and 3 are 40% and 16% lower than the New Brunswick average, respectively. These rate variations may be partly explained by the presence of a psychiatric care facility in Restigouche, explaining the high apparent per capita rate in Region 5. In addition, there may be increased access to outpatient services in urban areas, decreasing the pressure on inpatient facilities to provide psychiatric care.

There are 27 hospital-active Psychiatrists distributed among all the regional hospitals. Bathurst Regional Hospital has three active Psychiatrists with a high mean inpatient load; Miramichi Regional Hospital has three Psychiatrists with low inpatient load (~100 RIW); and Campbellton Regional Hospital has six Psychiatrists with low inpatient load of 70 to 100 cases each.

The regional distribution model works well here with adequate numbers of Psychiatrists available to all regional hospitals. There is a clear division between an average census in the Psychiatry program of ten to twenty beds in the smaller regional hospitals, twenty to 35 census in the larger regional hospitals, and less than four in the smaller

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hospitals. Psychiatrists provide a significant number of outpatient visits on site in the Saint John Regional Hospital, Dr. Everett Chalmers Hospital, Dr. Georges Dumont Regional Hospital, and The Moncton Hospital.

PAEDIATRICS

There are 13 hospital-active paediatricians in the province. They are distributed among the regional hospitals, except for the Miramichi. Since there is no definitive Paediatric CMG apart from Cystic Fibrosis, per capita rates of paediatricians' service were reviewed, rather than rates of programmatic service, as was done for other programs. This demonstrated considerable variation in the rates of paediatricians' hospital-based service to the population. In general, the rates were lower in urban areas and higher in rural areas (consistent with overall hospitalization rates), with the notable exceptions of higher rates in Moncton (possibly due to the larger number of paediatricians per capita in this area) and low rates in the Miramichi, undoubtedly due to the absence of a hospital-active paediatrician. Paediatricians tend to cover hospital cases of children with gastroenteritis, asthma, bronchitis, and pneumonia. The majority of these cases among children are cared for by Family Physicians. At the Neonatology hospital sites, paediatricians also cover the Neonatal program.

CONCLUSIONS:

All regional hospitals require paediatrician support, which can be facilitated with inter-regional coordination/collaboration.

INTERNAL MEDICINE

There are 17 General Internists (identified as such in the CIHI DAD database) with greater than 50 total RIW caseloads in 1999/2000. These were distributed among Dr. Everett Chalmers Hospital (5), Miramichi Regional Hospital (4), Edmundston Regional Hospital (4), and Bathurst Regional Hospital (2), with The Moncton Hospital and Saint John Regional Hospital having one each. These specialists accounted for 4 to 6% of weighted cases at Miramichi Regional Hospital, Dr. Everett Chalmers Hospital, and Bathurst Regional Hospital sites, and 12% of weighted cases at Edmundston Regional Hospital. They account for less than 1% of weighted cases at the other sites.

These internists were primarily involved in the Family Practice and regional Cardiology programs (35% and 50% of their activity, respectively). At the four hospitals with the highest General Internist presence, the General Internists covered 50% of the Cardiology program and 6% of the Family Practice Program. Hence, General Internists are typically found at the smaller of the regional hospitals, and primarily cover the regional Cardiology programs. There is no consistent province-wide pattern of practice for which they are uniquely responsible. At smaller hospitals, Family Practitioners perform the work that General Internists typically do at regional hospitals. At the larger regional hospitals, this work is typically distributed among internal medicine subspecialists.

CONCLUSIONS:

General Internists are important particularly to smaller regional hospitals, where they account for a significant proportion of the weighted cases in the hospitals. These practitioners provide service for many of the core programs at regional hospitals.

SPECIALIZED PROGRAMS

These programs are generally sited at the larger base regional centres (RHCs 1B, 1SE, 2, and 3) and possibly at Bathurst Regional Hospital where numbers warrant. There is often the need for cooperative planning at the two Moncton sites (The Moncton Hospital and Dr. Georges Dumont Hospital) to achieve critical mass for call coverage, education, and human resource and technical infrastructure. For programs that are not provided in all regions, provincial planning is required to ensure equitable service delivery to all health regions. Key stakeholder groups must be involved in these provincial planning initiatives.

ORTHOPAEDIC SURGERY

The New Brunswick Orthopaedic Surgery program consists mainly of hip fractures, knee replacements, and hip replacements. Most of the Orthopaedic Surgery CMGs are regional, with only a few decentralized CMGs. Most New Brunswick patients receive Orthopaedic Surgery care in their region of residence. There is, however, a considerable amount of variation in the regional utilization of Orthopaedic Surgery. Region 6 has a utilization rate 22% below the provincial average, while Region 3 has a utilization rate 12% above the provincial average. Region 3's above-average utilization rate is most likely a result of the large Orthopaedic Surgery program located in this region. The relative underutilization of Orthopaedic Surgery services by Region 6's population is worthy of further investigation, as was noted in the CPD Group's Phase I report.

Orthopaedic Surgeons most often care for patients for whom they are the most responsible physician. However, Orthopaedic Surgeons also participate in the care of patients from other programs. Analysis of the participation of Ontario's specialty physicians in the care of patients from other programs demonstrates that Orthopaedic Surgeons participate in the care of a high percentage of the total RIWs of patients from Rheumatology, Plastic Surgery, Oral Surgery, and Vascular Surgery. Internists participate in the care of 29% of Ontario's orthopaedic surgery total RIWs and Family Practitioners participate in care of 18% of these RIWs. It is therefore necessary to have established General Internal Medicine specialists or medical subspecialists and Family Practice programs at hospitals where Orthopaedic Surgery programs are located.

Currently, Regions 4, 5, 6, and 7 are short of existing surgeons and/or FTE capacity for full programs. Bathurst Regional Hospital and Edmundston Regional Hospital have three surgeons, but these have inpatient practice at a mean level substantially lower than at urban centres. The present distribution of Orthopaedic Surgery services offers excellent access to patients from all regions in the province. The provincial average road distance from the patient's home to where they received Orthopaedic Surgery is 43 km, with 63 km being the highest regional average.

As with other programs, there is evidence to suggest that consolidation of some sites would be advantageous. The principals of sustainability and efficiency are the factors that most strongly support the consolidation of services. The existing sites, of which there are many, with two or fewer Orthopaedic Surgeons operating at the minimum annual RIW threshold, likely do not have a large enough referral populations to support independent Orthopaedic Surgery programs. These facilities will also likely have difficulty replacing their Orthopaedic Surgeons as these surgeons relocate or retire.

Scenario analysis performed for the Orthopaedic Surgery program demonstrates that there are some consolidation configurations that would enhance the program's efficiency and ensure greater sustainability without compromising geographic access. If the existing Orthopaedic Surgery programs were consolidated to the four base regional hospitals in addition to Bathurst Regional Hospital and Edmundston Regional Hospital, the provincial average distance travelled for Orthopaedic Surgery services would remain at 44 km.

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There are three levels of occupancy for Orthopaedics. The larger regional hospitals have between 17 and 27 Orthopaedic patients on average. The smaller regional hospitals have between three and seven. The other hospitals have less than one, except for Carleton Memorial Hospital (Woodstock) with two. This correlates with the FTE analysis, which demonstrates that there are approximately three or more orthopaedic FTEs in the larger regional hospitals, and one or two in the smaller regional hospitals.

CONCLUSIONS:

Orthopaedic Surgery is an established program at the larger regional hospitals. The smaller northern regional hospitals cannot currently sustain a fully independent program of adequate size. Coordination and consolidation of service in the Regions 5, 6, and 7 may reduce overall number of specialists required, as specialists would increase their caseload with exposure to greater population demand.

UROLOGY

Urology encompasses the care of urinary obstruction, urological cancers, and transurethral prostatectomy for benign prostatic hyperplasia. More than 80% of all weighted cases among patients in all regions except Region 5 were treated within region. One third of cases in Region 5 involved travel to other regions, primarily Regions 1B, 2, and 6. Despite this increased out of region travel, the per capita rate of Urology service in Region 5 was the highest in the province.

There are 17 hospital-active Urologists in the province, primarily and almost exclusively covering the Urology Program. These are distributed roughly according to the size of the regional hospitals: two or more specialists above the threshold of 100 RIW per year, and an equal number of expected Urology FTEs at the base regional hospitals and Bathurst Regional Hospital, with one each in the three smaller regional hospitals (Edmundston Regional Hospital, Campbellton Regional Hospital, and Miramichi Regional Hospital). There are 9 to 14 inpatients of the Urology program on average at Regions 1B, 2, and 3 hospitals and two to five in the other regional hospitals.

CONCLUSIONS:

The redistribution scenario analysis of Urology to the base regional hospitals plus Edmundston Regional Hospital and Bathurst Regional Hospital still leaves Edmundston Regional Hospital with only one physician FTE, which is not considered sustainable in isolation.

PLASTIC SURGERY

Plastic Surgery procedures encompass breast procedures, carpal tunnel release, wound debridement and skin grafting, and burn care. A significant proportion of care in this program is delivered by physicians other than Plastic Surgeons.

A large proportion of cases from Regions 4, 5, and 7 are treated in other RHCs, though this is not associated with low per capita rates of surgery.

There are 11 hospital-active Plastic Surgeons, distributed among the base regional hospitals and Bathurst Regional Hospital. The program is largely identified with Plastic Surgeons, with less significant overlap with other specialties than other surgical programs.

The Moncton Hospital and Dr. Everett Chalmers Regional Hospital have an average census of 6 Plastic Surgery patients. Saint John Regional Hospital has 4 and the other regional hospitals average between less than one (Campbellton) and two Plastic Surgery program patients.

CONCLUSIONS:

Scenario analysis suggests that the existing program distribution at the four large regional hospitals and Bathurst Regional Hospital is consistent with future distribution needs for the program. The existing distribution of the Plastic Surgery program in the four larger regional hospitals and Bathurst Regional Hospital would lead to a minimum FTE complement of at least three at all these hospitals, except the Dr. Georges Dumont Hospital which would be expected to have less than two FTEs, and where there are currently two surgeons.

VASCULAR SURGERY

The main CMGs in the Vascular Surgery Program are Aortic Replacement, Vascular Bypass Surgery, Carotid Endarterectomy, and other vascular repair and procedures. The majority of patients in Regions 5, 6 and 7 currently travel to the Region 1 RHCs for Vascular Surgery. Of these procedures, Elective Abdominal Aortic Aneurysm (AAA) repair, Carotid Endarterectomy, and lower extremity arterial bypass surgery have been identified as procedures for which referral to high volume hospitals would potentially reduce hospital mortality (Dudley 2000). The Leapfrog Group has set minimum annual hospital volume standards of 100 for carotid endarterectomy and 30 for abdominal aortic aneurysm (Leapfrog Group 2000).

The annual hospital volumes of AAA surgery (including ruptured aneurysms) and Carotid Endarterectomy are shown in Figure 10.

Figure 10: Annual hospital volumes of high-risk vascular surgery procedures

Hospital	AAA			Carotid Endarterectomy			Vascular Bypass		
	1997/98	1998/99	1999/2000	1997/98	1998/99	1999/2000	1997/98	1998/99	1999/2000
Dr. Georges L. Dumont Hospital	12	3	7	22	12	21	26	38	26
The Moncton Hospital	64	75	66	31	35	33	119	112	107
Saint John Regional Hospital	46	29	32	34	40	33	19	39	48
Dr. Everett Chalmers Regional Hospital	18	39	40	47	57	41	37	36	38
Edmundston Regional Hospital	13	22	21	56	47	48	41	46	36

The hospital annual volume of AAA repair is at or above the minimum standard of 30 at the Moncton Hospital, Saint John Regional, and Dr. Everett Chalmers Regional Hospitals. The minimum of 50 arterial bypass procedures is met at The Moncton Hospital and is increasing to that level at Saint John Regional Hospital. The minimum volume of 100 carotid endarterectomies is not met at any New Brunswick hospital. Vascular Surgeons are responsible for 78% of weighted cases for AAA repair, Carotid Endarterectomy, and arterial bypass surgery.

There are seven hospital-active Vascular Surgeons in the province, located at the four base regional hospitals and Edmundston Regional Hospital. Vascular Surgeons account for 56% of the Vascular Surgery program activity. Therefore, in some redistribution scenarios, the apparent FTE requirements are larger than the existing pool of surgeons. Where the cases are more concentrated, the average RIW per surgeon is large: 700 to 1,000 RIW at The Moncton Hospital and Dr. Everett Chalmers Hospital versus approximately 400 RIW at Saint John Regional Hospital and Dr. Georges Dumont Hospital. Edmundston Regional Hospital has low program volumes due to the small population. The patient census is 8 to 16 patients on average at the larger regional hospitals in the Vascular Surgery program, and four at Edmundston.

It is clear that the existing five-site model with seven active Vascular Surgeons is not the optimal strategy to meet the needs of the province. Scenarios with two-site models (Regions 1B and 1SE together, plus Region 2; or

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Region 1B and 1SE together, plus Region 3) are similar and would be expected to improve sustainability, access, and (for high-risk operations) quality. These scenarios would both increase overall provincial travel distance, but would lead to sustainable programs at each site. While there is inter-dependence between Vascular Surgery and other programs, including Orthopaedics, General Surgery, and other subspecialties, this would not mitigate against consolidation of Vascular Surgery, particularly high-risk procedures such as AAA repair, Carotid Endarterectomy, and lower extremity arterial bypass surgery at two sites.

CONCLUSIONS:

Vascular Surgery is currently a fragmented program, delivered at five different sites by seven active Vascular Surgeons. Although some care in the program is delivered by General Surgeons, the program would best be provided in sites centred around a minimum of three Vascular Surgeons.

OTOLARYNGOLOGY

The Otolaryngology program consists primarily of tonsillectomy, myringotomy, and nasal procedures, in addition to thyroid and head and neck procedures. The 13 hospital-active surgeons are sited at the base regional hospitals plus two at Bathurst Regional Hospital and one at Edmundston Regional Hospital. Although Edmundston Regional Hospital has one surgeon, lack of program siting at this facility would require significant additional travel to Regions 3 or 6. The only area with significant underservice is Region 5. This corresponds with the fact that the majority of patients in Regions 5 and 7 travel out of region for service. The Otolaryngology program accounts for between three and four census beds at the four base regional hospitals, and Bathurst Regional Hospital. Miramichi and Edmundston Regional Hospitals each have one census bed.

CONCLUSION:

It appears that the existing model of siting, where two or more surgeons practice, is adequate.

HAEMATOLOGY/ONCOLOGY

The discussion of Haematology in this report is restricted to inpatient and day surgery haematology activity, and therefore does not encompass all cancer care provided in the province. Additional information and data would be required to comprehensively plan cancer care, as well as stakeholder input from clinicians, hospital managers, and others. Such consultation is required to plan for cancer care provision, to ensure adequate access and sustainability of service.

Haematology CMGs include Leukaemia, Lymphoma, Chemotherapy, and care of other Neoplasms. The majority of patient cases in Regions 5, 6, and 7, and a large proportion of cases from Region 3, travel out of region for service. The existing distribution is a single Haematologist at regional hospitals in Regions 1B, 1SE, and 2. Substantial outpatient activity occurs only at Regions 1SE and 2. Consolidation scenarios demonstrate that moving the program to The Moncton Hospital alone increases provincial average travel from 68 to 105 km.

CONCLUSION:

Planning services for haematology ought to be coordinated with the overall planning of cancer care in the province.

PROVINCIAL PROGRAMS

THORACIC SURGERY

Thoracic Surgery CMGs include Resection of the Lung and Major Respiratory Procedures. The best chance for cure of lung cancer lies with successful surgical resection (Partridge 2002). Five year survival rates, 30-day mortality rates, and complication rates are better among patients of higher-volume hospitals, the gradient of survival improving steadily with increasing hospital size (Bach 2001). In addition, the standard for the minimum annual volume of esophagectomy is 7 per year (Leapfrog Group 2000). The annual number of extensive gastrointestinal procedures (primarily esophagectomies) is 4 at Chalmers and less than 3 at The Moncton Hospital, Dr. Georges Dumont Hospital, Saint John Regional Hospital, and Bathurst Regional Hospital. It is acknowledged that the policy responses to volume-outcome studies can be characterized in two ways; that is, as seeking to improve outcomes in existing sites, versus consolidation or referral to larger-volume hospitals (Hewitt 2000). In the context of Thoracic Surgery in New Brunswick, these responses are not mutually exclusive, since sustainability considerations also lead to consolidation planning and ought not to preclude systematic efforts to improve processes and outcomes at all facilities. Hospital annual volumes of Lung Resections are displayed in Figure 11.

Figure 11: Annual hospital volume of Lung Resection Procedures

Hospital	1997/98	1998/99	1999/2000
Dr. Georges L. Dumont Hospital	19	17	14
The Moncton Hospital	37	48	42
Saint John Regional Hospital	25	30	33
Dr. Everett Chalmers Regional Hospital	34	22	22
Edmundston Regional Hospital	5	6	8

Patients in Regions 5 and 7 are more often treated out of region, in RHC 1B. Relative regional utilization rates range from a high of 57% above average in Region 5 to a low of 21% below average in Region 7. There is one Thoracic Surgeon in each of Dr. Everett Chalmers Hospital, The Moncton Hospital, and Edmundston Regional Hospital. The low case numbers at Edmundston Regional Hospital lead to that surgeon performing other program services. These specialists are heavily involved in other programs (primarily General Surgery). There is considerable overlap of other surgical specialists with this program and of these specialists with other programs. Even if one restricts attention to "core" Thoracic Surgery cases (e.g., Major Respiratory Procedures and Lung Resections), there were 500 cases, at approximately 1,000 RIW, in the province. This translates to less than three surgeon FTEs. One third of these cases was done by a Thoracic Surgeon, one third by a General or Vascular Surgeon, and one third by other practitioners. Thoracic surgery accounts for bed census of four to six in the larger regional hospitals, with one bed census in Bathurst and Edmundston, and none in other facilities.

CONCLUSION:

Provincial planning is required for Thoracic Surgery to ensure integrated service delivery and access.

NEPHROLOGY

Nephrology CMGs include dialysis and other CMGs associated with the care of patients with kidney failure. There are currently two sites with three Nephrologists each: Dr. Georges Dumont Hospital and Saint John Regional Hospital. Saint John Nephrologists have lower inpatient activity but have significant outpatient activity.

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Currently, data are not readily available describing outpatient nephrology and dialysis in detail, therefore analysis and siting scenarios concentrate primarily on inpatient and day surgery services.

CONCLUSIONS:

Nephrology is a program which encompasses inpatient and outpatient care and is dependent on the presence of Urology and Vascular surgery programs. Future planning of nephrology services ought to involve provincial stakeholder input and take into consideration cross regional coordination of services.

NEUROSURGERY

Neurosurgery in New Brunswick has a small number of high average RIW CMGs (centralized only). Most common are craniotomy procedures, intracranial injuries, and trauma procedures including tracheostomy and gastrostomy, which are generally the result of swallowing and feeding problems for patients with brain injuries or other long-stay cases. There is some evidence that improved outcomes for cerebral aneurysm repair are associated with hospitals performing more than 30 cases per year (Dudley 2000). Currently both The Moncton Hospital and Saint John Regional Hospital average 16 aneurysm repairs per year.

Patient flow patterns for Neurosurgery show that patients are mainly treated in Regions 1SE and 2. There is significant variation among regions for Neurosurgery services. Region 4 has significantly lower utilization than the average and Region 7 has high utilization. For Neurosurgery, there is some variation in service by region that is not readily explained, but there does not appear to be supply driven utilization variation. Rather, the high variability in average RIW per case is a likely explanation for this variation.

CONCLUSIONS:

Neurosurgery is currently structured as two similar, relatively small programs in two sites. Evolution to a single provincial resource program, allowing for a rise in the number of practitioners and case volumes in a single site, may offer significant advantages in terms of sustainability and program enhancements. Stakeholder input would be required to guide such an evolution. Single site models increase average travel from 60 to 100 km overall. On the other hand, Neurosurgery is fundamental to a high-level trauma program, and elimination of the program in one site would compromise the degree of trauma care available at that site. Current bed census is at approximately 16 bed census at The Moncton Hospital and Saint John Regional Hospital.

NEONATOLOGY

Neonatology services are closely aligned with obstetrical services and are not neatly designated as centralized or non-centralized. Indeed, regional neonatology service plans have been traditionally organized in a hierarchical fashion. Neonatal intensive care ranges from that delivered in Perinatal Centres to that delivered in Level I Nurseries. The most complex care is delivered in Perinatal Centres (sometimes called Level IV NICUs), which are university-affiliated facilities capable of providing the highest level of care within a regional network appropriate to maternal and neonatal high-risk patients. Neonatal planning ought to be integrated with obstetrical care planning, to identify the sites for delivery of high-risk pregnancies.

Level III NICUs provide intermediate and intensive care as well as diagnosis and treatment of high-risk pregnancy and neonatal problems and accept selected maternal-fetal and neonatal transports from Level I or II facilities. Level III facilities make available a range of technical and subspecialty consultative support such as paediatric anaesthesiology, ophthalmology, paediatric surgery, genetic services, intensive cardiac services and

intensive neurosurgical services, and must demonstrate an adequate patient base to achieve an NICU average daily census to maintain the resources, expertise, and outcomes required. A Level III facility that elects not to provide all of these services must have established policies and procedures for transfer of these infants to a facility that can provide the service needed (Illinois Department of Public Health, 2001). It is preferable that Level III facilities are equipped and staffed to provide full time neonatal intensive care unit service to more than 15 patients per day (Phibbs 1996).

Level II units are staffed with Neonatologists and provide care for moderately ill infants, including mild to moderate respiratory distress (not requiring mechanical ventilation in excess of six hours), suspected neonatal sepsis, hypoglycemia responsive to glucose infusion, and asymptomatic neonates of diabetic mothers, nursery care of infants with a birth weight greater than 1,250 grams who are otherwise well, and nursery care of premature infants with gestation less than 32 weeks, but greater than or equal to 30 weeks. Some advocate for designation of Extended Level II units, which provide NICU care including, possibly, mechanical ventilation, for all but very low birth weight infants (those less than 1,250 or 1,500 grams) and those infants with highly complex problems (Richardson 1995).

The evidence regarding the association between NICU volumes and outcomes is founded on observational epidemiology studies rather than randomized clinical trials. Hence, the findings may be varied and their interpretation in a policy context has been contentious. For example, Field et al. identified better survival for infants less than 28 weeks gestation cared for in referral centres (Field 1991). Subsequently reviews of volume-outcome relationships were influenced by this study (Nuffield 1996). A follow-up study in the same region of the UK showed that these results were no longer sustained and were at variance with the influential Phibbs study (Field 1999). This apparent variance in results further complicates the task of drawing policy and planning conclusions from these data.

However, careful review of the Field studies reveals that the results may not be as contradictory as first appears. Much changed in the delivery of neonatal intensive care between the two eras under study. By the time of the second study, inter-hospital referral rates for premature infants (less than or equal to 28 weeks) were of the order of 40% of cases. Thus the later study demonstrated that the mortality rates amongst units was comparable given the extent to which selection and transfer of cases affected the work carried out in different settings. Field concludes, "there is evidence that the service is working in an integrated manner. The larger units, appropriately, attract a group of infants who are sicker than those whose care is entirely in the smaller units. The babies transferred for neonatal care tend to be sicker than those that normally receive treatment in the smaller units" (Field 1999). The current pattern of care at the three New Brunswick NICUs demonstrates much lower rates of inter-hospital transfer. Only 7% of Very Low Birth Weight (VLBW) infants were transferred between these three units in 1999/2000.

More recent reports from the Canadian Neonatal ICU Network refer to the lack of association between risk-adjusted mortality and patient volume in participating Canadian NICUs (CMAJ, 2002). However, direct reporting of this association (or lack thereof) has not been published (Basinski, 2002; CNICU, 2002b).

Neonatal service to a geographic area must encompass a network of Level I, II, and III NICUs, and a Perinatal Centre within an infrastructure that includes referral, transport, education, evaluation, and quality assurance (Richardson 1995). High risk babies have a 38% increased chance of survival if they are delivered in hospitals with Level III NICUs, with no significant increase in cost of care (Phibbs 1996). Hospitals with lower level NICUs (Levels II and II+) were not found to offer significant survival advantage over hospitals without NICUs. Targets for the percentage of VLBW infants delivered in Level I hospitals are generally around 10% (Gould 1999). New Brunswick should, therefore, develop an infrastructure that treats VLBW infants in the setting of a Level III NICU).

At 17 Canadian tertiary NICUs, the mean annual number of admissions to the ICU was 657, the mean NICU stay was 19 days, one quarter of patients were transferred in, and 43% were retro-transferred to a community

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facility before discharge home. Approximately 20% of cases were VLBW and 53% were <2,500 gram Birth Weight (Lee 2000). This Canadian experience can provide a guideline for New Brunswick in structuring its neonatology program, including transfer protocols to the Perinatal Centre in Halifax.

In New Brunswick, approximately 14% of VLBW neonates are born in hospitals other than the three hospitals offering care to VLBW neonates (The Moncton Hospital, Saint John Regional Hospital, and Dr. Everett Chalmers Regional Hospital). Only 1% is born in hospitals, not offering Caesarean Section capability. This is consistent with findings from elsewhere in Canada.

The three hospitals with Neonatal programs (Dr. Everett Chalmers Hospital, The Moncton Hospital, and Saint John Regional Hospital) all provide care to VLBW infants (See Figure 7A). They have similar case volumes, and are staffed by one (Dr. Everett Chalmers Hospital, The Moncton Hospital) or two (Saint John Regional Hospital) Neonatologists who provide the great majority of service within the program. All three units do not meet the minimum case volume criteria of 15 patients per day as expected of a full-fledged Level III unit, yet all care for an average of 3 to 4 infants born at less than 1,500 grams. All are at risk of losing existing service infrastructure and capacity to provide continuous service if they were to lose a single active Neonatologist. The Leapfrog Evidence-Based Hospital Referral standard set to ensure that highest-risk births (expected birthweight less than 1,500 grams or gestational age less than 32 weeks) occur in hospitals with at least 15 babies in the ICU each day (Leapfrog 2000). These babies account for 90% of neonatal deaths.

Figure 12: Statistics for Neonatal Program Facilities caring for VLBW Infants

Hospital	Bed Census	Very Low Birth Weight Census	Cases	Average Length of Stay	VLBW Hospital Mortality Rate
The Moncton Hospital	12.8	3.2	21	56.4	19%
Saint John Regional Hospital	11.1	3.5	22	57.7	18%
Dr. Everett Chalmers Regional Hospital	8.6	2.8	18	56.7	17%

Additionally, the care in these units is characterized by a very low degree of transfer of patients back to lower level units for convalescent care. Retro-transfers to lower level units, especially if they are closer to the family's home, would increase efficiency and convenience for families.

The Centralized Neonatal program (high risk infants) had 206 cases in New Brunswick in 1999/2000. Since evidence suggests that quality of outcome improves with average census of at least 15, the only sustainable scenario is to designate one of the hospitals as a Level III unit and designate one or both of the two remaining units as Level II or Extended Level II. This would imply transferring the most complex and resource-intensive cases (preferably prior to delivery, to be delivered at the hospital where they will be treated) to a single provincial Level III NICU, with explicit policies for the transfer of particularly difficult cases to the Perinatal Centre in Halifax.

The Neonatology redistribution models are essentially equivalent on the basis disruption of existing service delivery. There is also no differentiation between existing sites based on Obstetrics/Paediatrics backup.

CONCLUSIONS:

While there is not a single site in New Brunswick that may operate at a full Level III level that meets the minimum criteria of an average daily census of greater than or equal to 15, it should be possible to coordinate the care of high-risk infants at a single site with transfer policies to the Halifax Perinatal Centre for highly complex care involving, for example, neurosurgery, or cardiac surgery.

This shift of designation and resources to one unit would require a great deal of cooperation, and would change the patterns of practice and distribution of care in the province in a fundamental way. It would move

from three small units operating largely in isolation of each other, to a networked system. Such a network would include a single Level III neonatal unit, with support of Level I, Level II, and possibly extended Level II care units to provide stabilization and back-transfer among the remaining larger obstetrical hospitals (Level II or III obstetrics) in the province.

A provincial key stakeholder group of Neonatologists has convened to discuss the program and how the need for neonatology could best be met within the province. The CPD group commends this group for their efforts and supports their initiative. The CPD group agrees that the stakeholder group should review the conclusions from this report and the relevant literature. Decisions for reconfiguration of New Brunswick high-risk neonatal services ought to be accountable to the evidence and service criteria/parameters identified in the report. Siting and planning decisions should incorporate input from this stakeholder group.

Approximately 30% of weighted cases in the Neonatal program are associated with VLBW infants – ranging between 26% and 44% of weighted cases at the three existing neonatal units. These cases account for 35% to 47% of the total caseload for the four Neonatologists in New Brunswick. Hence, if there were triage of the VLBW cases to a single unit this would lead to decreased volumes at two of the units, and the need to increase the Neonatologist complement at the unit caring for the highest-risk infants.

CARDIAC SURGERY

Cardiac surgery in New Brunswick has a number of high RIW CMGs (centralized only). Most common are coronary bypass procedures and other cardio-thoracic procedures. Patient flow patterns for Cardiac Surgery indicate that patients are treated only in Region 2, as this is the only site for this service in New Brunswick.

There is significant variation among regions for Cardiac Surgery services. Regions 2 and 7 have higher utilization than the average. High use in Region 2 is likely associated with available supply of services, while in Region 7 it is likely due to increased burden of illness. There are three surgeon FTEs for this program, who perform between 600 and 670 RIWs per year. Volume-outcome thresholds for invasive cardiac procedures set annual minimum limits of 500 Coronary Bypass procedures and 400 angioplasty procedures (Leapfrog Group 2000). These limits are only possible in New Brunswick through continued siting of the program at a single site.

ANALYSES SPECIFIC TO CARDIAC SURGERY

Typically, measures of access to invasive cardiac services must include the assessment of both invasive cardiology and cardiac surgery due to the relative exchangeability of Percutaneous Transluminal Coronary Angioplasty (PTCA) and Coronary Artery Bypass Surgery (CABS). In addition, since invasive cardiac testing (angiography) is a precursor to most elective procedures, consideration of angiocatheterization rates is of interest to explain variations in surgery and PTCA.

Since procedures vary with populations studied, markers of the underlying cardiac disease burden in different areas are necessary to account for intervention variation due to the population rather than the health care system. Rates of acute myocardial infarction (AMI) are useful in this regard. AMI cohorts may also be studied as a unique cohort to ascertain the influence of supply induced demand and referral networks on variations in procedure rates among a relatively homogeneous group of patients.

For cardiac surgery and cardiology, valid and reliable measures of process and outcome have been used in other jurisdictions. Although they are related almost solely to patients who have had acute myocardial infarctions, these measures have become indicators for the quality of service provided to cardiac surgery or cardiology patients in general. In Ontario, the results of these indicators were compiled in an 'ICES Atlas' of Cardiovascular Health and Services, published by the Institute for Clinical Evaluative Sciences (Naylor and Slaughter, 1999).

Such indicators can be used to identify those areas where access to diagnosis and treatment is variable across the province of New Brunswick.

Figure 13: Annual Standardized Provincial Cardiovascular Rates

Year	AMI/1,000	PTCA/1,000	CABS/1,000	PTCA/AMI	CABS/AMI
1997	3.37	1.26	0.84	0.37	0.25
1998	3.25	1.53	0.81	0.47	0.25
1999	3.44	1.50	0.80	0.44	0.23

Figure 13 shows the annual standardized rates of AMI, PTCA, and CABS among the population greater than 20 years of age. The relative population based rates of PTCA to AMI and CABS to AMI show that there has been an increase in PTCA utilization with steady rates of CABS (adjusted for AMI rates).

Figure 14: Three-year Standardized Regional Cardiovascular Rates (1997/1998 to 1999/2000)

Region	AMI/1,000	PTCA/1,000	CABS/1,000	PTCA/AMI	CABS/AMI
1	2.89	1.04	0.62	0.36	0.21
2	2.93	1.63	0.84	0.56	0.29
3	3.84	1.26	0.73	0.33	0.19
4	2.96	1.15	0.65	0.39	0.22
5	3.58	1.35	0.76	0.38	0.21
6	3.39	0.94	0.72	0.28	0.21
7	4.32	1.63	0.85	0.38	0.20
Province	3.28	1.28	0.73	0.39	0.22

Figure 14 shows that, with the last three years of available data, the rates of AMI have varied significantly among regions, likely indicating variations in underlying cardiac disease burden in New Brunswick. In addition, PTCA and CABS rates have also shown wide variation, partly, but not wholly explained by variations in AMI by region. These variations may be related to physician referral patterns, or to rates of diagnostic angiography, a precursor to revascularization in elective cases.

For the AMI cohort, analysis was conducted of the rates of Percutaneous Transluminal Coronary Angioplasty (PTCA) or Coronary Artery Bypass Surgery (CABS) within two months of AMI occurrence. In this direct analysis of a homogeneous group, displayed in Figure 15, it is clear that patients in Region 2 are much more likely to have a post-AMI revascularization (about one third) compared to rates in other regions.

Figure 15: Regional Standardized Cardiovascular Rates by Year

Region	PTCA %			CABS %			PTCA/ CABS %		
	97	98	99	97	98	99	97	98	99
1	10.3	15.6	13.5	4.8	4.4	3.8	15.2	20.1	17.3
2	24.1	28.9	29.8	6.7	3.2	6.0	30.8	32.0	35.3
3	9.8	15.3	12.9	3.7	2.6	5.4	13.5	17.9	18.2
4	8.2	17.7	11.8	1.8	2.5	2.0	10.0	20.3	13.7
5	2.7	10.9	13.0	4.1	3.1	9.3	6.8	14.1	22.2
6	4.8	4.5	11.2	3.6	3.7	6.0	8.4	8.2	17.2
7	9.3	15.9	12.4	3.1	7.1	5.2	12.4	23.0	17.5

Bed census for the Saint John Regional Hospital was approximately 17 in 1999/2000.

CONCLUSIONS:

The trend of increased use of PTCA over time is marked. The discrepancies in interventional cardiology rates among regions are only partly explained by differences in the marker of underlying cardiac disease burden: AMI rates. Among the cohort of AMI patients themselves, the supply-driven variation is obvious: twice the number of patients in Saint John Regional Hospital receive revascularization procedures in a timely fashion compared to those treated in other hospitals. This variation has been well described in the literature and does not necessarily imply an over-utilization of revascularization in Saint John. Rather, it may reflect underuse of revascularization in other regions through lack of appropriate referral and triage mechanisms to deal with both the general population with cardiac disease and the AMI cohort.

Comparisons of New Brunswick revascularization rates to those in Ontario are particularly instructive. In Ontario, post-AMI revascularization rates in 1996/1997 were approximately 16% overall and 30 to 35% in revascularization hospitals, virtually the same as results from New Brunswick's regional analysis. New Brunswick's PTCA rate per capita is approaching the Ontario target of 1.6/1,000 persons. The New Brunswick CABS rate of 0.73/1,000 lags the Ontario target of 1.1/1,000 persons. Hence, New Brunswick rates are about right for Region 2 and low elsewhere.

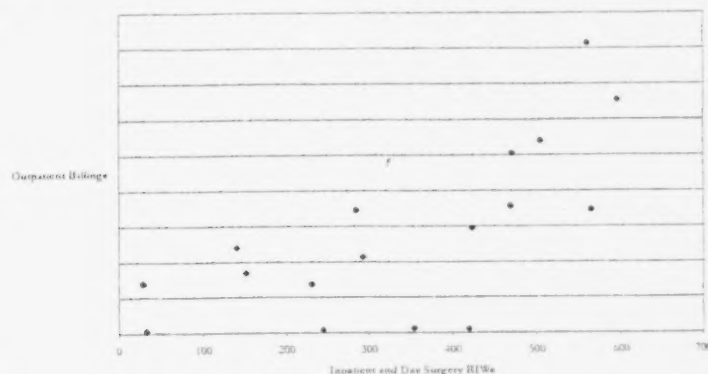
Provincial guidelines for regional rates of Cardiac Surgery and Interventional Cardiology, based on measures of disease burden and revascularization among AMI survivors, would be particularly helpful in ensuring access to service for all New Brunswickers.

ADDITIONAL SERVICES (INCLUDING AMBULATORY CARE)

As was stated in earlier sections of this report, not all physician specialties and clinical programs are examined in this report. Some programs lack reliable data, others were too small to be examined on a provincial basis, and others did not have a case mix that was uniquely treated by specific physicians.

Analysis of physician billing data allowed for identification of inpatient RIWs, outpatient visits, and office visits. This analysis was conducted to understand the relationship between inpatient and day surgery activity with outpatient or ambulatory activity. Remarkably, the outpatient billings for all physician types were generally scalable with inpatient RIWs. That is, physicians who have greater inpatient activity also tend to have greater outpatient activity. For example, Figure 16 plots inpatient RIWs for Cardiologists compared to outpatient billings. The trend illustrates the consistency between higher RIWs and higher outpatient billings. This reassured the CPD Group that by closely analyzing inpatient and day surgery, a large proportion of physicians who have only outpatient practices was not being missed.

Figure 16: Inpatient RIWs versus Outpatient Billings for Cardiologists



Detailed results of the ambulatory care analysis are presented in Appendix C (slides 127 to 130), and identify outpatient visits, office visits, and inpatient hospital RIWs by facility and by physician type. These data should be interpreted with caution, as the source is the physician billing database, which is not generally used for administrative purposes; therefore, coding of visits may not be consistent across physicians.

PROGRAM CLUSTERING

TRAUMA SERVICES

Trauma services are hierarchical and involve multiple providers. The more complex cases are centralized to sites where neurosurgery is available, currently at The Moncton Hospital and Saint John Regional Hospital. The next tier of services is equivalent to a specialized regional program and is based on Vascular Surgery, Plastic Surgery, Orthopaedic Surgery, and General Surgery. These exist at the larger base regional centres (with Bathurst Regional Hospital having no Vascular Surgeon).

The New Brunswick Healthcare Association document, *Access to Specialized Care – Accountability for Patient Transfers* (March 2001), identifies the need for coordinated trauma services to ensure appropriate access and timely treatment for patients. Recommendations from this report include, among others:

- Development and support of trauma centres with necessary critical mass based on geography, demographics, linguistic needs, and areas of expertise required;
- Adequate capital investment in equipment required for critical care;
- Establishment of a 1-800 telehealth network to provide advice during transfer of a critical care patient, as well as a coordinated tracking system to monitor availability of physicians, ICU beds, and operating rooms;
- Designation of levels of trauma care based on national standards and the evaluation of current capabilities to care for trauma patients at hospitals in the province; and
- Development of evidence-based, standardized care plans with transfer protocols for critical care. The CPD group supports the NBHA recommendations.

The DHW Committee on Inter-facility Transfer has also developed recommendations that are relevant for trauma services.

OBSTETRICS, PAEDIATRICS, NEONATOLOGY, AND GENERAL SURGERY

Obstetrical, Neonatal and Paediatric care must be provincially coordinated to meet the needs spanning the spectrum from low-risk obstetrics to the care of high-risk pregnancy and neonates with complex care needs. Where Family Practice (low risk) obstetrics is planned, adequate coverage from Obstetricians and/or General Surgeons is required.

HOSPITAL CLASSIFICATION SYSTEM

ORGANIZING FACILITIES USING AN INTEGRATED HOSPITAL PLANNING APPROACH: THE CONCEPT OF A HOSPITAL CLASSIFICATION SYSTEM

In the New Brunswick context, it is clear that the organization of hospital-based clinical programs is necessarily hierarchical, ranging from the widespread distribution of decentralized care to the need for provincial organization of specialized care delivered at a single site. While the individual attributes of clinical programs, their interrelationships, and the workforce requirements to adequately deliver care are evident, there remains the need to transform the parameters for distributing individual clinical programs into descriptions of the typical service mandates of hospitals hosting these programs. To that end, a generic hospital classification system is outlined to specify the approximate criteria that define hospitals of varying size and scope of practice. This classification is not meant to classify existing institutions. Rather, it is to be used as a conceptual planning tool to identify the range of hospitals that would be expected to serve the province of New Brunswick. As with all classification systems, caution must be exercised in approaching the planning parameters as guides rather than as rigid and constraining formulae.

The CPD group's mandate of facility planning requires consideration of the overall structure of hospitals within the province, the communities and populations they serve, and the scope and scale of clinical services that may be offered by acute care facilities in the province. A classification scheme of hospital scale and scope may take into consideration factors such as:

- the number of physicians available to provide emergency and inpatient services;
- the volume of hospital services;
- the range of existing clinical programs;
- the number of health care professionals supporting existing clinical programs;
- the size of the service population; and
- the availability of support services in nearby hospitals.

Such a hospital classification system would define the roles and responsibilities of specific hospital types, which would help to delineate the relationships among hospitals in the province. By articulating the inter-

dependencies and relationships among hospitals, an integrated hospital system can be developed, where patient flow is efficient and effective and where quality care is delivered in a timely way at the most appropriate location. This 'bigger picture' view of New Brunswick hospitals facilitates overall and clinical program planning for an integrated hospital network.

A classification system for New Brunswick hospitals provides a conceptual framework from which to plan processes and relationships among hospitals. While it may provide a 'current state' snapshot of hospitals in New Brunswick, it will be more useful as a planning tool for moving forward in the future. A hospital classification system can lay the foundation for an integrated Provincial Health Plan in New Brunswick.

HOSPITAL CLASSIFICATION SYSTEMS IN OTHER JURISDICTIONS

Schemes for designation of hospital types have been developed in Ontario (Ontario Joint MoH/OHA Working Group, 1998), Nova Scotia (Nova Scotia Clinical Service Steering Committee, 2001) and Saskatchewan (Fyke, 2001). Although these schemes may vary in their structure, degree of specificity, and minimal size requirements for hospital status, they all are fundamentally the same in describing a spectrum of hospitals. Hospital types range from small facilities -- maintaining emergency services, basic laboratory and radiography services, and a basic inpatient Family Practice care -- to centralized, tertiary or provincial hospitals, offering a gamut of complex services including cardiac surgery, neurosurgery, oncology, and other specialized referral services.

A HOSPITAL CLASSIFICATION SYSTEM FOR NEW BRUNSWICK

Based on frameworks developed in other jurisdictions, an initial New Brunswick approach to hospital classification was customized to reflect its unique health care environment. A potential hospital classification system for New Brunswick was presented to the CPD group, similar to that proposed for Northern and Rural Ontario and Nova Scotia. It showed the range of potential services, and outlined the number of Family Practitioners, case volumes, and referral population for each type of hospital (refer to Figure 17).

In this classification, the number of Family Practitioners, and not Specialists, is a parameter because of the key role of Family Practitioners in all types of hospitals. Further, the number of Family Practitioners is a differentiating factor among the hospital types.

The CPD group has endorsed the concept of a hospital classification system for New Brunswick, recognizing the value of an approach that could integrate hospitals by defining roles and responsibilities, as well as relationships among hospitals.

Figure 17: New Brunswick Hospital Classification System

Hospital Classification	A: Rural	B: Community	C: Small Regional	D: Base Regional	Provincial Programs
Range of clinical services	Family Practice inpatient, Outpatient services (e.g, diabetic counselling, day hospital, physiotherapy, etc.)	Family Practice, Pre-Natal Care, Post-Natal Care, Level I Obstetrics, Complex continuing care beds	General Surgery capability, Level II Obstetrics capability, Regional Cardiology, Psychiatry, General Internal Medicine, Paediatrics (Requires cooperative planning with other sites)	General Surgery Program, Level II Obstetrics Level I Neonatology. May have one or more subspecialty programs: Plastic Surgery, Vascular Surgery, Level II Neonatology	Sited at single Base Regional Hospitals, or cooperatively at two Base Regional Hospitals. Neurosurgery, Cardiac Surgery, Level III Neonatology
Family Practitioners	<=5	6-10	>10	>>10	Province
RIW	<1,000	1,000-3,000	5,000-10,000	15,000-30,000	
Referral Population	<3,000	4,000-10,000	20,000-40,000	75,000-200,000	

DISCUSSION OF A NEW BRUNSWICK HOSPITAL CLASSIFICATION SYSTEM

While the table in Figure 17 will not capture all nuances of existing or required care in New Brunswick, it serves as a framework for determining the existing nature of the distribution of services and for considering facility and personnel options for program planning. Specific base regional hospitals may be designated as a provincial resource for certain programs, and it is likely that such provincial resources would be in different regions depending on the program in question.

Of primary concern to all stakeholders in the health care system in New Brunswick is the sustainability of health care delivery resources, particularly in smaller facilities. These concerns are expressed in terms of the ability to recruit and retain physicians and nurses, and the availability of adequate funding. As previously discussed, a starting point for considering sustainability of any clinical program in a given care setting is that the program must fulfill some basic criteria, including:

- The program must be available when needed. For acute hospital services, this usually means that the program must be available on a continual basis to meet urgent and emergent needs.
- The program must be staffed by physicians, nurses, and other health professionals at an adequate level to provide on-call coverage and 24- hour inpatient care.
- The program must be supported by infrastructure services and facilities to enable its continuous availability.
- Patient referral and triage arrangements must be formally established within and among regions and among related hospital sites.

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- The program must be affordable. This means that a minimal critical mass of cases and/or patients is required to acquire and maintain the necessary infrastructure.
- The program must be stable and hence able to withstand the loss of key individual personnel.
- The program must be planned and maintained in cooperation with the regions which depend upon it.
- Program planning must involve relevant clinical stakeholder groups.
- The role of medical training, continuing medical education, and team-based clinical learning must be considered in program planning and siting decisions.

Therefore, a distinction is made between formal clinical *programs*, which meet these criteria, and clinical *capabilities*, which may exist in institutions to provide safe and effective care in a clinical area but do not meet the minimum requirements of stability and sustainability. Clinical capability, without the full sustainable program, is usually marked by reliance on one or two physicians, the lack of additional subspecialty services, and the lack of modern, specialized equipment and facilities. For example, a small regional hospital (Level C from Figure 17) might have the *capability* to perform General Surgery due to the presence of a General Surgeon; however, reliance on only one surgeon would limit its sustainability as a *program*.

The basic premise of such classification systems is that all hospital facilities are part of a formal integrated hospital system network. Patients are regularly transferred from smaller facilities, which perform triage and stabilization, to larger facilities, where complex needs can be met. Patients may be transferred back to local facilities that may coordinate home care and outpatient services, and may additionally provide convalescent care, rehabilitation, or long-term care.

CONCLUSIONS:

All hospital facilities should offer basic emergency and acute inpatient services typically provided by Family Practitioners. Programs providing services of increasing complexity and specialization, and those that are dependent on a small number of practitioners, should be sited in increasingly larger institutions offering a wider scope of services. The organization of hospital services according to such a hospital classification system can help facilitate integration among facilities, by defining roles and scope of services.

CHAPTER 7: CONCLUSIONS

The analysis, information, and observations within this report represent a dynamic set of tools to be used in on-going clinical program planning. These can be invaluable in setting evidence-based parameters and policies for clinical programs, but to do so they must be based on the most recent data available. Since March 2002, when this report was finalized for the CPD Group, a more recent year of CIHI data has become available, 2001 Census data has been published, and growth projections for populations have been updated. Informed future planning must use the most recently available hospital data, physician information, census (population) information, and must take into account other factors that may influence hospital and clinical programs.

Further, analysis must take into account potential changes in coding patterns (i.e., by examining historical coding patterns), ensuring that only true changes in patient acuity or volumes are applied to future program planning.

Other factors that may affect future program planning include changes in health care human resources, including physician and clinical staff availability, and capital expenditures for equipment, any of which may affect the ability to provide clinical programs at specific sites. The effect of these factors on clinical programs must be understood and addressed within planning models.

The planning tools presented in this document form the basis for a rational approach to quantifying resource allocation within the hospital system using benchmarks for healthcare delivery derived from existing patterns of care. Additional inputs into planning and policy processes are obviously demanded. These include multiple stakeholder involvement in prioritization and decision-making when addressing choices and tradeoffs. For instance, while the centralization of certain services imposes a burden on those who must travel to obtain the services, and in the absence of safeguards may create differential access to these services, greater regionalization of the same service may come at the price of sustainability, cost inefficiency, and possibly compromised quality. Health care planning requires that many such issues be confronted in the course of crafting solutions subject to the financial, human resource, and other constraints.

In addition, planning for this component of the healthcare system must be done in conjunction with planning for integration with other sectors within the system including “upstream” services such as public health programmes and primary and preventive care, and “downstream” services such as hospice, home, chronic, rehabilitative and long-term care.

In conclusion, the CPD group has developed a set of dynamic tools that can help to plan clinical programs for New Brunswick based on available evidence. The power of these tools is dependent on the use of current data to give the best information possible, and a commitment to using evidence in making decisions. Used appropriately, the Clinical Program Design tools can help to plan and shape a sustainable, efficient, and high quality hospital system for the province, based on quantitative information and best practice.

GLOSSARY OF TERMS

<i>Access</i>	Ability to receive service by patients within the province. Key dimensions of access are: 1. distributive access (do patients receive the service?) 2. temporal access (how long must patients wait for service?) 3. geographic access (how far must patients travel for service?) 4. language access (do patients receive service in the official language of their choice?)
<i>Age And Sex Standardization</i>	A method for eliminating the influence of differing age and sex distributions on indicators in population based analysis.
<i>Annualized</i>	Used when statistics are based on more or less than one year of data; the calculation of a one year proportion of the relevant statistic (e.g., patient days, weighted cases, etc.).
<i>Approved Beds</i>	The number of beds designated to a patient program and hospital in the NB Hospital Services Master Plan.
<i>Base regional hospitals</i>	Refers to the larger regional hospitals: Dr. Everett Chalmers Regional Hospital, The Moncton Hospital, Dr. Georges Dumont Hospital, and Saint John Regional Hospital.
<i>Bed</i>	A measure of capacity to place patients who are in the facility at any given time. The bed number is the average census plus an overhead to meet the need to accommodate varying numbers of patients over time.
<i>Case Mix Group</i>	Refers to groupings of clinically similar acute inpatient cases, based on diagnosis and procedure data provided by the patient abstract. Cases grouped under the same CMG are expected to be homogenous in terms of clinical characteristics and resource consumption. Examples of CMGs are: Acute Myocardial Infarction, Uncomplicated Vaginal Delivery, and Total Hip Replacement. CMGs are maintained and refined annually by the Canadian Institute for Health Information.
<i>Case weights</i>	See Resource Intensity Weights (RIW).
<i>Census</i>	The number of patients within a hospital at any given time. Census fluctuates hourly, daily, weekly, and monthly within a hospital.
<i>CIHI (Canadian Institute for Hospital Information)</i>	A not-for-profit federally chartered company to which hospitals are required to submit information on each inpatient (and some ambulatory patients) at the time of their discharge.
<i>Complexity (Referring To Case Mix)</i>	Case Mix Groups are further sub-divided into as many as four complexity levels based on the presence of co-morbid conditions and other complicating diagnoses.
<i>Day Surgery Case</i>	Eligible cases, typically procedural, requiring the facilities of an acute care hospital. Patients are not admitted to the hospital overnight. This definition is currently under review in New Brunswick.
<i>Demographic Characteristics</i>	The patient's non-clinical descriptive factors: Age, Sex, Socioeconomic Status, etc.

<i>Dimension of distribution (centralized, regional, decentralized)</i>	Terms used to indicate the degree of hospital specialization, through the distribution of service across the province. Centralized services are generally provided in one or two sites within the province; regional services are generally offered in regional hospitals; and decentralized services are generally offered in most hospital sites.
<i>Expected Length of Stay (ELOS)</i>	The CIHI national 'benchmark' for length of stay, which can be applied to specific groups of cases for benchmarking analyses.
<i>Extra-Mural Program</i>	Refers to New Brunswick's Home Care services program, which is operated by the RHCs through a number of units across the province.
<i>Fee-For-Service</i>	A system in which the provider (usually physician) is remunerated based on the number and type of services provided as opposed to a fixed income (salary).
<i>Fiscal year</i>	Hospital budget year, from April to March.
<i>FTE</i>	A measure of case volume within a clinical domain of activity, measured in units of the average volumes of practitioners who are primarily responsible for that program.
<i>Global Funding/Budget</i>	A system of hospital funding based on a pre-determined budget that is meant to cover most hospital expenses.
<i>Grouper (e.g., CMG 99 grouper)</i>	A method used to group cases into CMGs, based on diagnoses and procedures provided to the patient. This methodology changes because the CMGs change as CIHI updates them. It is essential to group cases using the same grouper for valid analyses.
<i>Hospital System Master Plan</i>	The document outlining the Province's strategy for distribution of resources for delivery of hospital services. The Hospital System Master Plan details, by facility, the approved beds by type and the clinical programs authorized to be delivered at each site.
<i>Inter-Regional Flow</i>	Occurs when patients from one health region receive services by RHCs in another region.
<i>Out-Of-Province Flows</i>	Patients from outside New Brunswick receiving services in NB.
<i>Outpatient</i>	A patient receiving hospital services without being admitted.
<i>Physician Resources Advisory Committee (PRAC)</i>	The committee of physicians established to advise the Department on all aspects of physician resource management, including the optimum number and mix of physicians and the monitoring system for physician supply and demand.
<i>Population-Based Patient Care Funding Distribution Formula</i>	In general, a method for distributing funding to hospitals in a jurisdiction based on the expected volume and type of activity.
<i>Premature Mortality Rate</i>	The rate of death before the age of 75 years old, for a given population. This is a key indicator of population health status.
<i>Region Hospital Corporation (RHC)</i>	The eight self-contained corporations created by the <i>NB Hospital Act and Regulations</i> to deliver hospital services to New Brunswickers, each RHC having full management authority over all facilities located geographically within the region.
<i>Regional Health Authorities (RHA)</i>	The eight self-contained health authorities legislated by the NB Government to deliver hospital services to New Brunswickers, each RHC having full management authority over all facilities located geographically within the region.

<i>Regionalization</i>	The organization and management of health care services in a province by geographic region.
<i>Resource Intensity Weights (RIW)</i>	Also called case weights, or weighted cases. An RIW is a measure of relative resource consumption for cases grouped under Case Mix Groups (CMG). It is based on a national case cost database and calibrated annually by the Canadian Institute for Health Information (CIHI). The average case (nationally) would have an RIW of 1.0. The higher the average RIW of a hospital, the greater the average resource intensity (or cost) of its patients. Currently, RIWs are calculated for <i>acute</i> inpatient and day surgery cases only. In New Brunswick, however, acute and non-acute cases are not always identified and coded (i.e., abstracted) separately, leading to inaccuracies in the assignment of CMGs and RIWs.
<i>Separations</i>	A measure of the number of hospital inpatient discharges, deaths, transfers out, and sign-outs against medical advice, in any given period.
<i>Socio-economic status (SES)</i>	Social and economic measures used to describe a population's status in these areas (e.g., income, household size, etc.).
<i>Specialist</i>	A medical practitioner with additional training in an area of particular specialization, certified by the Royal College of Physicians of Canada or the Royal College of Surgeons of Canada.
<i>Typical cases</i>	Cases classified as having a typical length of stay by CIHI. Length of stay is below the CMG-specific trim point. Generally indicates the usual nature of patients, within a given CMG.
<i>Weighted cases</i>	See Resource Intensity Weight (RIW).

REFERENCES

- Bach PB, Cramer LD, Schrag D, Downey RJ, Gelfand SE, Begg CB. The influence of hospital volume on survival after resection for lung cancer. *N Engl J Med* 2001; 345: 181-8.
- Basinski A. Variations in mortality rates among Canadian NICUs — and anonymous reporting. *CMAJ* 2002, 167: 120.
- Birkmeyer JD. Should we regionalize major surgery? Potential benefits and policy considerations. *J Am Coll Surg* 2000; 109:341-9.
- Birkmeyer JD. High-risk surgery – Follow the crowd. *JAMA* 2000; 283: 1191-2
- Birkmeyer JD, Finlayson EV, Birkmeyer CM. Volume standards for high-risk surgical procedures: potential benefits of the Leapfrog initiative. *Surgery* 2001; 130:415-22.
- Buchan H. Commentary on “Hospital volume and health care outcomes, costs and patient access”. *Evidence-based Health Policy and Management*, 1997 (June): 32.
- Canadian Institute for Health Information. 2001. National Health Expenditure Trends, 1975-2001. Report.
- Canadian Institute for Health Information. November 2002. Preliminary Provincial and Territorial Government Health Expenditure Estimates 1974/975 to 2002/2003.
- Chien LY, Whyte R, Aziz K, Thiessen P, Matthew D, Lee SK. Improved outcome of preterm infants when delivered in tertiary care centers. *Obstet Gynecol* 2001;98:247-52.
- College of Family Physicians of Canada, Society of Rural Physicians of Canada, and Society of Obstetricians and Gynaecologists of Canada. Joint position paper on training for rural family practitioners in advanced maternity skills and cesarean section. *Canadian Family Physician*. 1999; 45:2416-2274.
- Dudley RA, Johansen KL, Brand R, Rennie DJ, Milstein A. Selective referral to high-volume hospitals. Estimating potentially avoidable deaths. *JAMA* 2000; 283:1159-66.
- Field D, Hodges S, Mason E, Burton P. Survival and place of treatment after premature delivery. *Arch Dis Child* 1991; 66: 408-11.
- Field D, Draper ES. Survival and place of delivery following preterm birth: 1994-96. *Arch Dis Child Fetal Neonatal Ed* 1999; 80:F111-4.
- Fyke, Dr. Kenneth. 2001. Caring for Medicare: Sustaining a Quality System. The Commission on Medicare. Government of Saskatchewan.
- Ginsburg, E. 1977. The Many Meanings of Regionalization in Health. *Regionalization and Health Policy*. DHEW Publication No. (HRA) 77-623.
- Gould JB, Sarnoff R, Liu H, et al. 1999. Very low birth weight births at non-NICU hospitals: the role of sociodemographic, perinatal, and geographic factors. *Journal of Perinatology*; 19:197-205.

Clinical Program Design Phase IIA Report – Working Document

Hewitt M ed. Interpreting the volume-outcome relationship in the context of health care quality: workshop summary. Washington, D.C.: National Academy of Sciences, 2000.

Illinois Department of Public Health. Last updated 12/21/00. Regionalized Perinatal Health Care Code. (77 ILL. ADM. CODE 640).

International Neonatal Network, Scottish Neonatal Consultants, Nurses Collaborative Study Group. Risk adjusted and population based studies of the outcome for high risk infants in Scotland and Australia. International Neonatal Network, Scottish Neonatal Consultants, Nurses Collaborative Study Group. Arch Dis Child Fetal Neonatal Ed 2000;82:F118-23.

Joint Working Group of the Society of Rural Physicians of Canada and the Society of Obstetricians and Gynecologists of Canada. 1998. Joint Position paper on rural maternity care. Canadian Journal of Rural Medicine. 3(2): 75.

Leapfrog Group. Evidence-Based Hospital Referral Factsheet. November 2000. (http://www.leapfroggroup.org/FactSheets/EHR_FactSheet.PDF) (accessed 20 Feb, 2002)

Lee SK, McMillan DD, Ohlsson A, et al. 2000. Variations in practice and outcomes in the Canadian NICU network: 1996-1997. Pediatrics; 106:1070-9.

LeFevre M, Sanner L, Anderson S, Tsutakawa R. The relationship between neonatal mortality and hospital level. Journal of Family Practice. 1992; 35:259-64

Naylor, C. David and Pamela M. Slaughter (editors). 1999. Cardiovascular Health and Services in Ontario: An ICES Atlas. Toronto: Institute for Clinical Evaluative Sciences.

Nova Scotia Clinical Services Steering Committee. 2001. Making Better Health Care Decisions for Nova Scotia.

Nuffield Institute for Health, University of Leeds and NHS Centre for Reviews and Dissemination, University of York. Hospital volume and health care outcomes, costs and patient access. Effective Health Care 1996; 2(8)

Ontario Joint Ministry of Health/Ontario Hospital Association Working Group. 1998. Rural and Northern Health Parameters and Benchmarks.

Partridge MR. Thoracic surgery in a crisis. BMJ 2002; 324:376-7.

Phibbs CS, Bronstein JM, Buxton E, Phibbs RH. 1996. The effects of patient volume and level of care at the hospital of birth on neonatal mortality. Journal of the American Medical Association. 1054-9.

Premier's Health Quality Council, New Brunswick. May 2001. Health Renewal: A Discussion Paper.

Provincial Utilization Management Coordinating Committee (New Brunswick). 1999. Hospital System Performance Measurement in New Brunswick. Phase I. PUMCC Recommendations and Technical Report.

Richardson DK, Reed K, Cutler JC, et al. 1995. Perinatal regionalization versus hospital competition: the Hartford example. Pediatrics; 96:417-23.

Clinical Program Design Phase IIA Report – Working Document

Roos, Noralou, Charlyn Black, John Wade, and Kathleen Decker. 1996. How many general surgeons do you need in rural areas? Three approaches to physician resource planning in southern Manitoba? *Canadian Medical Association Journal*. 155(4): 395-401.

Roos, Noralou, Randy Fansoo, Keumhee C. Carriere, Norman Frohlich, Bogdan Bogdanovic, Peter Kirk, and Mamoru Watanabe. 1997. *Canadian Medical Association Journal*. 157(9): 1215-1221.

Roos, Noralou, Randy Fransoo, Bogdan Bogdanovic, et al. 1999. *Medical Care*. 37(6): JS206-JS228.

Roos NP. Establishing a population data-based policy unit. *Med Care* 1999;37:JS15-26.

Roos NP, Black C, Roos LL, FAU - Fr, N., Frohlich N, DeCoster C, Mustard C, Brownell MD, Shanahan M. Managing health services: how the Population Health Information System (POPULIS) works for policymakers. *Med Care* 1999;37:JS27-41.

Roos NP, Black C, Frohlich N, DeCoster C, Cohen M, Tataryn DJ, Mustard CA, Roos LL. Population health and health care use: an information system for policy makers. *Milbank Q* 1996;74:3-31.

Sankaran K, Chien LY, Walker R, Seshia M, Ohlsson A, Lee SK, et al. (2002). Variations in mortality rates among Canadian neonatal intensive care units. *CMAJ*. 166(2): 173-8.

Shoo K. Lee, Koravangattu Sankaran, Li-Yin Chien, Robin Walker, Mary Seshia, and Arne Ohlsson. (2002). Variations in mortality rates among Canadian NICUs — and anonymous reporting. *CMAJ*. 167: 120-121.

Shortell SM, Gillies R, Anderson D., Erickson K, Mitchell J. *Remaking Health Care in America*, 2nd Edition: The Evolution of Organized Delivery Systems. Jossey-Bass Publishers: San Francisco: 2000.

Simunovic M, To T, Theriault M, Langer B. Relation between hospital surgical volume and outcome for pancreatic resection for neoplasm in a publicly funded health care system. *CMAJ* 1999;160:643-8.

Sinclair, Duncan G. 1999. *Better Hospitals, Better Health Care for the Future: Summary Report on Hospital Restructuring 1996-1999*. Health Services Restructuring Commission, Ontario.

Smith J. Redesigning health care. *BMJ* 2001; 322: 1257-1258.

Smith R. Reconfiguring acute hospital services. No easy answers, but there are principles we should follow. *BMJ* 1999; 319:797-8.

Sosa JA, Bowman HM, Gordon TA, Bass EB, Yeo CJ, Lillemoe KD, Pitt HA. Importance of hospital volume in the overall management of pancreatic cancer. *Ann Surg* 1998;228:429-38.

Spencer, Dr. J.A. Interview regarding Fort Frances clinic. January 14, 2002.

Wexler MJ. More procedures, better quality of care? Is there a case for regionalization of pancreatic resection for neoplasm? *CMAJ* 1999; 160:671-3.

APPENDICES

CPD PHASE IIA REPORT

Appendix A: Region Hospital Corporations Questionnaire & Responses

Appendix B: Definitions and Methodologies

Appendix C: Program-Specific Analysis (attached presentation)

APPENDIX A: REGION HOSPITAL CORPORATIONS QUESTIONNAIRE & RESPONSES

INTRODUCTION TO QUESTIONNAIRE

The Clinical Program Design process affords the opportunity to build on the provincial Physician Resource Management Plan (1999) and the Hospital System Master Plan (1997 draft). The Clinical Program Design Group provides input to the System Planning Committee's decisions on facility planning and the distribution of clinical programs ensuring equitable access, enhanced quality, and efficiency of care.

The recommendations of the Clinical Program Design Group will be achieved through consensus and collaborative planning. To achieve these goals, it is important that the clinical areas of priority and concern within each region be identified and brought forward to the Clinical Program Design Group for consideration in the planning process.

Hence, each Hospital Corporation is asked to provide information to facilitate the planning process. We are particularly interested in your identification of:

- a) Clinical program areas where your Corporation provides care at a greater level than may be found in other regions. This may be identified by the provision of higher degrees of specialized care or more complex care than may be available in other regions. These programs may be extended to provide substantial volumes of these services to other regions of New Brunswick.
- b) Clinical program areas where your Corporation is not able to deliver care at a level sufficient to meet the needs of the population you serve. This results in patients from your region having to travel to other regions or having diminished access to these services.
- c) Clinical program areas where you anticipate constraints in the next 5 years. This may result from anticipated changes in the physician workforce or significant changes within the population.

QUESTIONNAIRE AND RESPONSES

For your Hospital Corporation, please answer each of the following questions. Please provide as much supporting evidence as possible for your responses.

QUESTION 1

Please identify and describe Clinical Programs in your Hospital Corporation that you feel are provided above the provincial average levels of complexity and/or volume.

For each of these programs:

- a) What are their main features?
- b) Where are they sited?
- c) To what extent do patients in other regions/jurisdictions use these programs?

RESPONSE:

Each region described the programs they consider to be providing above provincial average complexity and volume, each facility where such care is provided, and the extent to which those services are utilized by out-of-region or out of province clients. Clinical programs where regions consider themselves to be unique or exceptional were delineated. Complete responses of individual RHCs are available on request.

QUESTION 2

Identify clinical program areas where your Corporation is not able to deliver care at a level sufficient to meet the needs of the population you serve. This results in patients from the region having to travel to other regions or having diminished access to these services.

RESPONSE:

Responses described clinical programs considered by regions to be relatively under serviced or under stress, particularly with respect to what services they are not able to adequately provide. The following issues related to under serviced or stressed programs surfaced frequently in responses:

- | | |
|--|-----------------------------------|
| ➤ Inadequate funding | ➤ Availability of qualified staff |
| ➤ Lack of medical staff and funding | ➤ Physician remuneration |
| ➤ Funding for staff recruitment | ➤ Retention & recruitment |
| ➤ Inappropriate levels of care in acute beds | ➤ Travel distance |
| ➤ Fragmented mental health | ➤ Lack of family physicians |
| ➤ Waiting list | ➤ Funding shortfalls for oncology |

QUESTION 3

In which Clinical Programs do you anticipate diminished ability to provide service within the next 5 years? Please provide reasons and quantitative projections where possible.

RESPONSE:

RHCs identified clinical areas where constraints may occur in the next 5 years as a result of such changes in the environment as physician shortages or significant change in population. The following issues affecting such constraints were raised frequently in the responses:

- Funding
- Availability of qualified nursing staff
- Availability of technical, professional staff
- Aging Population
- Increased patient expectations
- Waiting times for tertiary services
- Access- Travel times
- Physician staff
 - Ability of new family practitioners to provide hospital services
 - Recruitment of specialists
 - Lack of Medicare funding for vacant physician FTEs
 - Senior privileges (semi-retired)

QUESTION 4

Under what conditions would your region consider formal discussions about jointly planning and sharing resources with other regions?

RESPONSES:

- a) RHCs described what conditions would be necessary to ensure the success of this type of planning:
- Remain patient focused:
 - Language and cultural homogeneity
 - Enhanced access
 - Clear communication of planning to the public
 - Patient acceptance
 - Establish provincial consultation committee:
 - Establish formal agreements
 - Integrated management structure
 - Physician participation and partnership:
 - Integrated medical staff arrangements
 - Physician recruitment and retention strategies
 - Physician mobility
 - Well established referral network of physicians
- b) Responses also suggested the requirements for this type of planning and in some cases discussed specific clinical programs or services as examples. The following themes were prevalent:
- Acquisition of necessary support structures
 - Design decisions regarding data mechanisms
 - Openness of all RHCs
 - Win/win for all RHCs
 - Adequate funding for start-up and operation of technology
 - Equipment and technical availability
 - Proper use of technology
 - De-fragmentation to maintain critical mass
 - Enriched or upgraded ambulance service

APPENDIX B: DEFINITIONS AND METHODOLOGIES

PRINCIPLES FOR METHODOLOGY DEVELOPMENT

An organizing principle for the work of the CPD group has been the requirement that planning be undertaken from a basis of understanding the patterns, distribution, and nature of existing New Brunswick clinical practice. This understanding must be coupled with recognition of the relationship between these patterns of practice and the physician resources upon which they are based. As such, a number of factors were recognized which defined the initial work of the committee:

- a) No preexisting methodology exists to adequately integrate the three basic views of the New Brunswick hospital care system:
 - a. the view from the perspective of clinical services delivered to the population, including markers of population need for health services;
 - b. the view from the perspective of the range and volume of services provided by different physician groups; and
 - c. the view from the perspective of the hospitals which provide the infrastructure to support basic and specialized service delivery.

Any new approach would need to integrate these views to appropriately plan for hospital services in New Brunswick.
- b) Any planning process needs to specify the goals and mandate of planning. These in turn will define the necessary analysis.
- c) The planning process should begin with a specification of the existing distribution and nature of hospital clinical services to the population of New Brunswick, the distribution and activity of physicians within the province, and the aggregation of clinical services in individual hospitals.
- d) The methods developed to analyze existing hospital discharge data (or other data) should overcome the lack of congruence between the currency of clinical activity in the Hospital System Master Plan (i.e., beds) and the number of physicians specified in Physician Resource Allocation Committee documents.
- e) The delineation of hospital programmatic activity must be specified not only according to volume, but also according to clinical scope – i.e., it should be based on an explicit grouping of hospital clinical services.
- f) Finally, the range and volume of work of various physician specialist types should be adequately described.

Accordingly, the group agreed upon the development of analytical methods for hospital discharge abstract data (both inpatient and day-surgery data) that would satisfy the above specifications. The approach defined two dimensions of clinical activity.

The first dimension was that of clinical *programs* – aggregations of clinical services, largely specified by individual physician specialty types. The second, called *dimensions of distribution*, related to the provincial distribution of services, varying from those basic services, which were relatively homogeneously distributed across the province, to those which were offered in only one or two provincial sites.

DEVELOPMENT OF DEFINITIONS FOR PROGRAMS AND DIMENSIONS OF DISTRIBUTION

PROGRAMS

The definition of clinical programs was based on the Canadian Institute for Health Information (CIHI) discharge abstract data from fiscal years 1997/1998 through 1999/2000 (grouped according to CMG 99 grouper). Case Mix Groups (CMGs) were categorized into programs according to the most responsible physician's specialty. This alignment of the program groups with the physician specialty designation facilitates an intuitive understanding among the diverse stakeholders in health care.

The analysis proceeded in two steps:

First, CMGs were assigned to a specialist program if, for greater than 50% of all Resource Intensity Weights (RIW), the most responsible physician was of the identified physician specialty type. In the case of the Family Practice program, CMGs were assigned to it if the most responsible physician was a Family Practitioner for greater than 75% of RIWs. For example, CMGs in the initial Cardiology program grouping were those for which Cardiologists provided the majority of care. This step resulted in matching 60% of CMGs (and 64% of associated RIWs) to a program.

Second, the remaining CMGs were assigned to a clinical program according to a statistical procedure called cluster analysis. Cluster analysis identified the degree of overlap of the distribution of individual physicians most responsible for the care of patients within each CMG. For example, CMGs were grouped together if the physicians most responsible for the care of patients within each CMG tended to be the same type of physician within each hospital in New Brunswick. As a result, this technique assigned all unmatched CMGs from the first step to the "closest" program.

This methodology evolved based on feedback from group members, RHC representatives, and DHW and THiNC Information Management Inc. staff. Additional stakeholder feedback led to further changes, which include:

- the splitting of CMGs with significant differences in proportion of adult and paediatric cases into adult and paediatric subsets; and
- the revision of program assignment of cases to include both CMG and age of the patient.

DIMENSIONS OF DISTRIBUTION

In an effort to avoid confusion with what various stakeholders in the health care system refer to as "levels of care", the CPD group sought new nomenclature to describe how clinical services are distributed across regions. Terminology that recognized that the distribution of cases was likely due to differences in their complexity and in their resource intensity was required.

The CPD group adopted the new term, dimensions of distribution, to designate the degree of specialization for a given CMG or service. For the purpose of this report and future system planning, the dimension of distribution will be referred to as either decentralized, centralized, or regional.

A dimension of distribution was defined for each CMG based on the existing New Brunswick distribution of cases within each CMG. CMGs with a relatively widespread distribution throughout all New Brunswick hospitals were defined as decentralized. CMGs with greater than 75% of their weighted cases occurring in, at most, two hospital sites were defined as centralized. The remaining CMGs were defined as regional.

Personnel from all RHCs reviewed the initial definitions of programs and dimensions of distribution (previously referred to as "care intensity and distribution levels"). The group received and incorporated feedback regarding the methods through surveys and site visits to all regions.

DATA DESCRIBING PROGRAM GROUPINGS AND DIMENSIONS OF DISTRIBUTION

The methodologies described previously allow for the description of inpatient and day surgery activity using the new program groupings and dimensions of distribution. The following section shows the results of the application of these methodologies in New Brunswick. *All figures include inpatient and day surgery data for fiscal years 1997/1998 to 1999/2000, and do not incorporate ambulatory care data.*

Figure A shows the annualized weighted cases in each program, across the dimensions of distribution. The most common programs (by RIW) are Family Practice, General Surgery, Obstetrics and Gynaecology, Orthopaedic Surgery, and Cardiology. The most common program by weighted cases is Family Practice, which reflects the large degree to which hospital care in New Brunswick is provided by Family and General Practitioners.

Figure A: Annualized Weighted Cases (RIW) by Program and Dimension of Distribution
(rounded to nearest hundred, 1997/1998 to 1999/2000 annualized)

Program	Decentralized	Regional	Centralized	Total
Family Practice	41,100	16,500	-	57,600
General Surgery	6,600	7,600	-	14,200
Obstetrics/Gynaecology	1,100	10,500	-	11,600
Orthopaedic Surgery	400	9,700	800	10,900
Cardiology	6,100	2,400	2,000	10,500
Psychiatry	3,300	4,600	-	7,900
Urology	2,000	3,100	100	5,200
Vascular Surgery	600	3,200	-	3,800
Neurosurgery	500	1,200	1,900	3,600
Haematology	400	2,600	500	3,500
Otolaryngology	100	2,700	-	2,800
Plastic Surgery	400	2,300	100	2,800
Ophthalmology	-	2,300	100	2,400
Neonatology	-	1,200	1,200	2,400
Cardiovascular Surgery	-	-	2,200	2,200
Thoracic Surgery	-	2,100	-	2,100
Nephrology	900	200	700	1,800
Rheumatology	500	300	-	800
Dentistry	-	500	-	500
Infectious Disease	-	300	200	500
Oral Surgery	-	100	200	300
Paediatrics	-	300	-	300
Total	64,000	73,700	10,000	147,700

Figure B shows the percentage of weighted cases across programs for the province, by dimension of distribution. This illustrates that some programs comprise a larger or smaller proportion of decentralized, regional, or centralized services across the province. For example, the Family Practice program makes up 64.3% of decentralized services in New Brunswick, 22.5% of regional services, 0.0% of centralized services, and 39.0% of services overall. The Cardiovascular Surgery program percentages are quite different, accounting for 0.0% of decentralized services, 0.1% of regional services, 22.0% of centralized services, and 1.5% of services overall in New Brunswick. Note that for Figures 2 and 3, out of province RIWs have been removed; this does not change the results significantly but provides a more accurate representation of New Brunswick program distributions.

Figure B: Percentage of Weighted Cases (RIW) by Program and Dimension of Distribution (1997/1998 to 1999/2000)

Program	Decentralized	Regional	Centralized	Total
Family Practice	64.3	22.5	0.0	39.0
General Surgery	10.4	10.3	0.1	9.6
Obstetrics/Gynaecology	1.7	14.3	0.4	7.9
Orthopedic Surgery	0.6	13.1	7.6	7.3
Cardiology	9.5	3.2	19.8	7.1
Psychiatry	5.1	6.3	0.0	5.4
Urology	3.2	4.2	1.2	3.6
Vascular Surgery	0.9	4.4	0.0	2.6
Neurosurgery	0.7	1.6	18.8	2.4
Haematology	0.6	3.5	5.2	2.4
Otolaryngology	0.2	3.6	0.2	1.9
Plastic Surgery	0.6	3.1	0.7	1.8
Ophthalmology	0.0	3.2	0.7	1.6
Neonatology	0.0	1.6	11.5	1.6
Cardiovascular Surgery	0.0	0.1	22.0	1.5
Thoracic Surgery	0.0	2.8	0.0	1.4
Nephrology	1.3	0.3	6.9	1.2
Rheumatology	0.8	0.4	0.0	0.5
Dentistry	0.0	0.7	0.0	0.4
Infectious Disease	0.0	0.3	2.4	0.3
Oral Surgery	0.0	0.1	2.4	0.2
Paediatrics	0.0	0.4	0.0	0.2
Total	0.0	0.0	0.0	0.0

Notes:

- Out of Province RIWs have been removed

Figure C shows the percentage of weighted cases for each program across dimensions of distribution, demonstrating that some programs are more decentralized (e.g., Family Practice), while others are more centralized (e.g., Cardiovascular Surgery). In Family Practice, 71.3% of weighted cases are categorized as decentralized, 28.7% as regional, and 0.0% as centralized. Cardiovascular Surgery, however, has a higher proportion of weighted cases that is considered centralized (98.0%), with 0.0% decentralized and 2.0% regional.

Figure C: Percentage of RIW across Dimensions of Distribution by Program (1997/1998 to 1999/2000 annualized)

Program	Decentralized	Regional	Centralized	Total
Family Practice	71.3	28.7	0.0	100.0
General Surgery	46.7	53.2	0.1	100.0
Obstetrics/Gynaecology	9.6	90.1	0.4	100.0
Orthopedic Surgery	3.8	89.1	7.1	100.0
Cardiology	58.2	22.5	19.3	100.0
Psychiatry	41.3	58.7	0.0	100.0
Urology	38.7	58.9	2.4	100.0
Vascular Surgery	15.8	84.2	0.0	100.0
Neurosurgery	13.1	32.6	54.2	100.0
Haematology	10.6	74.2	15.2	100.0
Otolaryngology	3.6	95.8	0.6	100.0
Plastic Surgery	14.1	83.4	2.5	100.0
Ophthalmology	0.0	97.0	3.0	100.0
Neonatology	0.0	49.9	50.1	100.0
Cardiovascular Surgery	0.0	2.0	98.0	100.0
Thoracic Surgery	0.0	100.0	0.0	100.0
Nephrology	49.1	10.7	40.2	100.0
Rheumatology	63.6	36.0	0.4	100.0
Dentistry	0.0	100.0	0.0	100.0
Infectious Disease	0.0	50.6	49.4	100.0
Oral Surgery	0.0	26.4	73.6	100.0
Paediatrics	0.0	99.6	0.4	100.0
Total	43.3	49.8	6.9	100.0

Notes:

- Out of Province RIWs have been removed

The definition of programs aligns clinical programs with closely associated physician specialties. Figure D illustrates this alignment by showing what proportion of weighted cases is seen by the Specialist most closely associated with the program and what proportion is seen by Family Practitioners. Note that these percentages do not add to 100%, because a proportion of weighted cases within a program may be seen by Specialists who are not the ones most closely associated with the program.

In Figure D, it is evident that some programs, such as Orthopaedic Surgery, have a high proportion of RIWs (84.9%) carried out by the corresponding program Specialist, whereas others, such as Rheumatology, have a lower percentage (25.4%) carried out by the most closely associated Specialist. In some cases, this is because a large proportion is instead seen by a Family Practitioner; for example, in Cardiology, 36.3% of weighted cases are seen by the most closely associated Specialist and 36.6% are seen by Family Practitioners.

Note that the Family Practice program is unique because the Family Practice "Specialist" is, in fact, a Family Practitioner; therefore, the percentage of weighted cases associated with the Specialist is equal to the percentage seen by Family Practitioners.

Figure D: Percentage of Annualized Program RIW by Specialists and by Family Practitioners (1997/1998 to 1999/2000 annualized)

Program	Weighted Cases (RIW)	% by Specialists	% by Family Practitioners
Family Practice	57,700	73.4	73.4
General Surgery	14,200	63.9	14.0
Obstetrics/Gynaecology	11,700	75.0	19.3
Orthopedic Surgery	10,900	84.9	4.7
Cardiology	10,500	36.3	36.6
Psychiatry	7,900	69.4	26.3
Urology	5,300	75.4	14.5
Vascular Surgery	3,800	54.6	10.7
Neurosurgery	3,500	50.6	20.6
Haematology	3,500	31.6	34.9
Otolaryngology	2,800	78.0	7.1
Plastic Surgery	2,700	64.5	8.2
Ophthalmology	2,400	89.1	1.8
Neonatology	2,300	55.0	13.4
Cardiovascular Surgery	2,300	78.8	0.5
Thoracic Surgery	2,100	23.3	13.4
Nephrology	1,800	34.2	28.4
Rheumatology	800	25.4	54.2
Dentistry	500	73.6	1.0
Infectious Disease	500	26.4	36.3
Oral Surgery	300	37.7	0.6
Paediatrics	300	47.0	23.6

Where Figure D showed how program RIWs are divided among physician specialists or family practitioners, Figure E shows how physician specialist RIWs are divided among Specialist and Family Practice programs. This figure illustrates the distribution of weighted cases for each physician specialty among associated programs. For some specialists, such as Cardiovascular Surgeons or Urologists, a large proportion of their work is contained within their associated programs (e.g., Cardiovascular Surgery, 95.7%, and Urology, 82.7%).

Other physician specialties, however, may not have a one-to-one relationship with the program associated with them. For example, Paediatricians and Neonatologists both provide services under the Neonatology program and General Surgeons, Gastro-enterologists, and Thoracic Surgeons all provide services under the General Surgery program. Again, the Family Practitioner "Specialist" is, in fact, a Family Practitioner; therefore, the percentage of RIW in the Specialist Program is equal to the percentage in the Family Practice Program.

Figure E: Percentage of Physician Specialty RIW within Specialist and Family Practice Programs (1997/1998 to 1999/2000 annualized)

Physician Specialty	RIW	Program	% in Specialist Program	% in Family Practice Program
FAMILY PRACTITIONER	58,400	Family Practice	72.5	72.5
GENERAL SURGEON	13,000	General Surgery	70.1	12.2
ORTHOPAEDIC SURGEON	10,600	Orthopedic Surgery	87.4	3.8
OBSTETRICIAN & GYNAECOLOGIST	9,300	Obstetrics/Gynaecology	93.6	3.4
PSYCHIATRIST	5,700	Psychiatry	96.3	3.5
CARDIOLOGIST	5,200	Cardiology	72.9	18.7
UROLOGIST	4,800	Urology	82.7	8.3
VASCULAR SURGEON	4,100	Vascular Surgery	51.3	9.0
INTERNIST	3,900	Cardiology	46.2	37.5
PAEDIATRICIAN	3,200	Neonatology	20.3	58.2
OTOLARYNGOLOGIST	2,700	Otolaryngology	79.5	7.7
NEUROSURGEON	2,500	Neurosurgery	71.5	12.5
PLASTIC SURGEON	2,400	Plastic Surgery	73.6	4.6
OPHTHALMOLOGIST	2,200	Ophthalmology	95.8	2.3
GASTRO-ENTEROLOGIST	2,100	General Surgery	17.6	67.3
CARDIOVASCULAR SURGEON	1,900	Cardiovascular Surgery	95.7	0.7
HAEMATOLOGIST	1,800	Haematology	63.1	26.7
THORACIC SURGEON	1,600	General Surgery	47.4	14.6
NEONATOLOGIST	1,400	Neonatology	87.2	6.6
NEPHROLOGIST	1,300	Nephrology	45.2	29.4
GERIATRICIAN	1,100	Psychiatry	3.4	89.6
PHYSIATRIST	1,000	Neurosurgery	2.8	95.8
INFECTIOUS DISEASE SPECIALIST	800	Cardiology	17.8	39.9
RESPIROLOGIST	600	Thoracic Surgery	22.1	51.9
ONCOLOGIST	500	Haematology	59.6	29.6
RHEUMATOLOGIST	500	Rheumatology	39.3	26.9
NEUROLOGIST	500	Neurosurgery	12.0	76.1
DENTIST	400	Dentistry	97.8	0.1
ANAESTHESIOLOGIST	300	Neurosurgery	8.5	62.3
ENDOCRINOLOGIST	300	Cardiology	20.8	52.1
ORAL SURGEON	300	Oral Surgery	44.4	0.9
RADIOLOGIST	100	Vascular Surgery	71.5	18.4

The application of program definitions and dimensions of distribution to New Brunswick inpatient and day surgery data provided a chance to verify the validity and relevance of these new methodologies to the current hospital system environment. Based on CPD group discussions and site visit feedback, these methodologies are valid and important tools that can be used to plan clinical programs for the province.

Appendix C: Program-Specific Analyses

Clinical Program Design Phase IIA

1

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2

Family Practice – Program Description

ICD-10	ICD-10 Description	P	Discharge	Total
Number				RIR
81	OTHER FACTORS CAUSING HOSPITALIZATION		Region	2,113
140	CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)		Region	1,034
861	NON-EXTENSIVE UNRELATED I&A, PROCEEDING		Region	761
772	DEMENTIA WITH OR WITHOUT DELIRIUM WITH ACUTE ONSET		Region	566
148	NEONATAL WEIGHT < 2000 GM (NORMAL NEWBORN)		Region	617
960	EXTENSIVE UNRELATED I&A, PROCEDURES		Region	399
773	DEMENTIA WITH OR WITHOUT DELIRIUM WITHOUT ACUTE ONSET		Region	566
646	NEONATAL WEIGHT > 2000 GM WITH LAGGARIAN DELIVERY		Region	444
109	ORTHOPEDIC AFTERGARE		Region	422
284	ESOPHAGITIS, GASTROENTERITIS AND GASTROENTEROPATHY		Discontinued	420
141	SIMPLE PNEUMONIA AND PLEURISY		Discontinued	336
322	HEART FAILURE		Discontinued	314
103	SPECIFIC GASTROINTESTINAL DISORDERS (EXCEPT TRANSIT)		Discontinued	2487
142	CHRONIC BRONCHITIS		Discontinued	2219
647	OTHER SPECIFIED AFTERGARE		Discontinued	1776
231	ACUTE MYOCARDIAL INFARCTION		Discontinued	1386
149	TRACHEOBRONCHITIS		Discontinued	1380
118	RESPIRATORY INSUFFICIENCY		Discontinued	1348
441	DIABETES		Discontinued	1278
146	ASTHMA		Discontinued	1017
481	NUTRITIONAL AND MISCELLANEOUS METABOLIC DISORDERS		Discontinued	718
447	CELLULITIS		Discontinued	704
281	G.I. HEMORRHAGE		Discontinued	703
323	SEIZURE AND HEADACHE		Discontinued	680
314	TRANSIENT ISCHEMIC ATTACKS AND PRECEREBRAL ISCHEMIA		Discontinued	614
768	ORGANIC MENTAL DISORDERS ASSOCIATED WITH PHYSICAL DISEASE		Discontinued	617
125	LOWER URINARY TRACT INFECTION		Discontinued	603
278	DIGESTIVE SYSTEM MALNUTRITION		Discontinued	573
842	SIGNS AND SYMPTOMS		Discontinued	561
751	SEPTICEMIA		Discontinued	446
764	RED BLOOD CELL DISORDERS		Discontinued	347
041	DEGENERATIVE NERVOUS DISORDERS		Discontinued	331
147	OTHER RESPIRATORY DISORDERS		Discontinued	323
280	INFLAMMATORY BOWEL DISEASE		Discontinued	417
281	SECONDARY NERVOUS DISORDERS		Discontinued	419
228	OTHER CIRCULATORY DISORDERS		Discontinued	414
812	DRUG REACTIONS		Discontinued	414
819	DEPRESSION (MOROSENESS)		Discontinued	401

From: Hospital at LAC/US with other than 400 RIR, for report purposes

3

Family Practice – Patient Flow (RIW)

Patient came from	Region	Treated at							Total
		RHC1B	RHC1SE	RHC2	RHC3	RHC4	RHC5	RHC6	
1		4,809	8,259	54	65	3	4	4	13,250
2		14	98	11,127	378	1	1	2	11,625
3		10	19	274	12,210	61	48	8	12,661
4		24	8	18	198	4,132	42	4	4,426
5		88	59	15	22	8	3,193	113	3,497
6		275	166	53	33	2	26	6,444	7,019
7		179	262	32	99		1	333	5,032
Other Provinces		130	377	82	102	113	797	36	1,668
Total		5,530	9,247	11,655	13,106	4,319	4,112	6,943	59,177

4

Family Practice – Relative Regional Utilization Rates

Region	Actual Cases	Expected Cases	Utilization Rate
1	11,508	11,833	0.97
2	10,232	12,972	0.79
3	11,136	10,771	1.03
4	3,791	3,670	1.03
5	3,151	2,352	1.34
6	6,337	5,381	1.18
7	4,065	3,465	1.17

5

General Surgery – Program Description

CMG Description	Dimension of Distribution	Total RWR	RWR for Specialists
253 MAJOR INTESTINAL AND RECTAL PROCEDURES	Regional	2790	1712
254 GASTROSTOMY AND COLOSTOMY PROCEDURES	Regional	1279	954
258 LAPAROTOMY	Regional	594	413
750 MULTISYSTEMIC OR UNSPECIFIED SITE INFECTIONS WITH 1	Regional	494	120
315 CHOLECYSTECTOMY	Regional	334	280
255 LESS EXTENSIVE ESOPHAGEAL, STOMACH AND DUODENUM PRO	Regional	300	171
301 MAJOR PANCREATIC PROCEDURES	Regional	294	234
852 PROCEDURES CANCELLED (NRRH)	Regional	279	50
429 TOTAL MASTECTOMY FOR BREAST MALIGNANCY	Regional	272	242
434 BREAST BIOPSY AND LOCAL EXCISION WITHOUT MALIGNANCY	Regional	230	219
432 SUBTOTAL MASTECTOMY AND OTHER BREAST PROCEDURES FOR	Regional	195	177
252 MAJOR ESOPHAGEAL, STOMACH AND DUODENUM PROCEDURES	Regional	181	121
663 THORACO-ABDOMINAL PROCEDURES FOR TRAUMA	Regional	87	60
314 OTHER HEPATOBILIARY AND PANCREATIC PROCEDURES	Regional	81	45
263 ABDOMINAL LAPAROSCOPY	Regional	71	22
703 OTHER O.R. PROCEDURES OF BLOOD AND BLOOD FORMING OR	Regional	69	20
802 POST-OPERATIVE COMPLICATIONS WITH UNRELATED O.R. PR	Regional	61	15
113 COMMON DUCT EXPLORATION	Regional	59	47
317 LAPAROSCOPIC CHOLECYSTECTOMY	Decentralized	1701	1446
269 BILATERAL HERNIA PROCEDURES	Decentralized	896	786
297 OTHER G.I. DIAGNOSES	Decentralized	680	280
329 BILIARY TRACT DISEASES	Decentralized	514	118
325 PANCREAS DISEASES EXCEPT MALIGNANCY	Decentralized	481	108
290 G.I. OBSTRUCTION	Decentralized	460	138
262 SIMPLE APPENDECTOMY	Decentralized	413	331
264 ANUS AND STOMAL PROCEDURES (NRRH)	Decentralized	336	265
687 THORACO-ABDOMINAL INJURIES	Decentralized	303	81
271 UNILATERAL HERNIA PROCEDURES (NRRH)	Decentralized	248	214
756 POST-OPERATIVE AND POST-TRAUMATIC INFECTIONS	Decentralized	223	45
261 COMPLICATED APPENDECTOMY	Decentralized	154	112
438 OTHER DERMATOLOGICAL PROCEDURES FOR MALIGNANCY OR	Decentralized	120	44
134 PNEUMOTHORAX	Decentralized	78	19
435 PERIANAL AND PILONIDAL CYST PROCEDURES	Decentralized	52	45

6

General Surgery – Patient Flow (RIW)

Patient came from	Region	Treated at								Total
		RHC1B	RHC1SE	RHC2	RHC3	RHC4	RHC5	RHC6	RHC7	
1		1,307	1,733	31	2	1	1	4	12	3,095
2		1	23	2,929	72			1		3,026
3		3	7	146	2,791	22	3	4	22	2,998
4		9	5	35	57	985	21	2		1,114
5		24	23	12		4	749	69	1	882
6		124	57	17	1	1	7	1,358	3	1,569
7		32	73	28	26		1	72	764	996
Other Provinces		33	110	44	47	49	164	27	4	478
Total		1,534	2,032	3,243	2,937	1,062	945	1,536	807	14,156

7

General Surgery – Regional Relative Utilization Rates

Region	Actual Cases	Expected Cases	Utilization Rate
1	3,095	3,457	0.90
2	3,013	3,280	0.92
3	3,004	2,907	1.03
4	1,131	974	1.16
5	881	615	1.43
6	1,571	1,585	0.99
7	998	873	1.14

8

General Surgery – Distribution of Specialists Among Hospitals

Hospital	Number of Specialists	Specialists with >100 RIW	Avg. RIW for Specialists with >100 RIW	Total RIW for all Specialists
NH	42	30	360	13253
Saint John Regional Hospital	7	7	336	2775
Dr. Georges L. Dumont Hospital	3	3	336	1008
Dr. Everett Chalmers Regional Hospital	5	4	375	1575
The Montreal Hospital	3	3	425	1275
Bathurst Regional Hospital	5	3	375	1225
Compton Regional Hospital	5	2	431	825
Edmundston Regional Hospital	2	2	372	744
Mazamachi Regional Hospital	4	3	259	654
The Gaudet Memorial Hospital (Woodstock)	2	1	373	471
Hôtel Dieu de St. Joseph (Preston/Audover)	3	1	297	445
Charlotte County Hospital (St. Stephen)	2	2	206	412
Grand Falls General Hospital	1	1	239	239
The Garmocto Hospital	4	0	—	254
Sussex Health Centre	1	1	189	189
Centre Hospitalier de Gaspésie	1	1	162	162
Centre Hospitalier de Tracadie	1	0	—	96
Sackville Memorial Hospital	2	0	—	13
Tobique Valley Hospital (Plaster Rock)	1	0	—	9

9

General Surgery – Case Distribution of Program Among Specialists and Other Physicians

Hospital	Number of Physicians with RIW for Program	Number of Physicians with >50 RIW for Program	Number of Specialists with >50 RIW for Program	Average RIW for all Physicians	Average RIW for Specialists	RIW for Program
NH	90	46	30	227	292	4473
Saint John Regional Hospital	36	30	7	242	337	2338
Dr. Everett Chalmers Regional Hospital	30	7	5	237	225	1323
The Montreal Hospital	34	7	5	224	338	1562
Dr. Georges L. Dumont Hospital	39	4	3	254	375	1552
Bathurst Regional Hospital	39	4	4	246	346	1341
Compton Regional Hospital	33	2	2	352	352	899
Edmundston Regional Hospital	35	3	2	236	334	823
Mazamachi Regional Hospital	31	3	3	342	342	803
The Gaudet Memorial Hospital (Woodstock)	34	2	2	194	314	231
The Garmocto Hospital	35	2	2	75	75	239
Hôtel Dieu de St. Joseph (Preston/Audover)	9	1	1	132	132	347
Grand Falls General Hospital	9	1	1	137	137	173
Charlotte County Hospital (St. Stephen)	33	1	1	94	94	159
Sussex Health Centre	4	1	1	122	122	137
Centre Hospitalier de Gaspésie	15	1	1	98	98	146
Centre Hospitalier de Tracadie	15	0	0	—	—	130

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General Surgery – Scenario: All Regional Hospitals

Patient Case from Region	Dr. Georges Dumont	The Montreal Hospital	St-John Regional Hospital	Dr. Everett Chalmers Hospital	Bathurst Regional Hospital	Compton Regional Hospital	Bathurst Regional Hospital	The Montreal Hospital	Elsewhere	Total RTR	Avg. Distance Travelled (km)
1 Actual RTR	1,281	1,496	26	0	0	0	0	11	91	1,286	18
Scenario RTR	1,281	1,496	26	0	0	0	0	11	91	1,286	17
2 Actual RTR	0	23	1,603	41	0	0	0	0	126	1,603	23
Scenario RTR	0	40	1,611	21	0	0	0	0	81	1,603	26
3 Actual RTR	0	0	142	1,003	0	0	0	18	831	1,003	36
Scenario RTR	0	0	121	1,028	0	0	0	18	1,011	1,003	47
4 Actual RTR	0	0	24	0	819	0	0	0	303	1,003	31
Scenario RTR	0	0	14	0	770	0	0	0	46	1,003	41
5 Actual RTR	23	23	0	0	0	762	40	0	41	874	31
Scenario RTR	23	23	0	0	0	762	40	0	41	874	31
6 Actual RTR	122	81	11	0	0	0	1,003	0	248	1,264	14
Scenario RTR	122	81	11	0	0	0	1,003	0	1,021	1,262	46
7 Actual RTR	72	72	28	0	0	0	0	712	0	982	46
Scenario RTR	72	72	28	0	0	0	0	712	0	982	46
Total Actual RTR	1,372	1,592	1,003	1,121	819	1,003	1,003	1,003	1,003	14,122	32
Scenario RTR	1,372	1,592	1,003	1,121	770	1,003	1,003	1,003	1,003	14,122	36
Percent Distance RTR	81	261	185	208	124	124	124	124	124	1,003	
PTB Actual	4.1	9.4	7.8	14	12	11	11	11	11	14.1	
PTB Scenario	4.1	9.4	4.1	14	12	11	11	11	11	14.1	

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General Surgery – Scenario: Base Hospitals plus Bathurst and Edmundston

Patient Case from Region	Dr. Georges Dumont	The Montreal Hospital	St-John Regional Hospital	Dr. Everett Chalmers Hospital	Hopital Regional D. Edmundston	Bathurst Regional Hospital	Elsewhere	Total RTR	Avg. Distance Travelled (km)
1 Actual RTR	1,281	1,496	26	0	0	0	74	1,286	18
Scenario RTR	1,281	1,496	26	0	0	0	91	1,286	17
2 Actual RTR	0	23	1,603	41	0	0	121	1,603	23
Scenario RTR	0	40	1,611	21	0	0	81	1,603	26
3 Actual RTR	0	0	142	1,003	0	0	812	1,003	36
Scenario RTR	0	0	121	1,028	0	0	770	1,003	47
4 Actual RTR	0	0	24	0	819	0	303	1,003	31
Scenario RTR	0	0	14	0	770	0	46	1,003	41
5 Actual RTR	23	23	0	0	0	4	141	874	31
Scenario RTR	23	23	0	0	0	4	141	874	31
6 Actual RTR	122	81	11	0	0	1,003	0	1,264	14
Scenario RTR	122	81	11	0	0	1,003	0	1,262	46
7 Actual RTR	72	72	28	0	0	0	712	982	46
Scenario RTR	72	72	28	0	0	0	712	982	46
Total Actual RTR	1,372	1,592	1,003	1,121	819	1,003	1,003	14,122	32
Scenario RTR	1,372	1,592	1,003	1,121	770	1,003	1,003	14,122	36
Percent Distance RTR	81	261	185	208	124	124	124	1,003	
PTB Actual	4.1	9.4	7.8	14	12	11	11	14.1	
PTB Scenario	4.1	9.4	4.1	14	12	11	11	14.1	

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Obstetrics/Gynaecology – Program Description

CMG CMG Description	Dimension of Distribution	Total RIW	RIWs for Specialist
379 MAJOR UTERINE AND GYNECAL PROCEDURES WITHOUT MALIGN	Regional	2946	280
411 VAGINAL DELIVERY	Regional	2129	1131
469 VAGINAL DELIVERY WITH COMPLICATING DIAGNOSIS	Regional	1338	854
492 CAESAREAN DELIVERY WITH COMPLICATING DIAGNOSIS	Regional	737	666
494 CAESAREAN DELIVERY	Regional	681	618
561 RECONSTRUCTIVE GYNECOLOGICAL PROCEDURES	Regional	530	377
602 REPEAT CAESAREAN DELIVERY	Regional	403	372
567 MISCELLANEOUS GYNECOLOGICAL PROCEDURES (MNRH)	Regional	329	292
417 ABORTIVE OUTCOME WITH D AND C	Regional	217	205
378 MAJOR GYNECOLOGICAL PROCEDURES FOR MALIGNANCY EXCEPT	Regional	167	156
401 REPEAT CAESAREAN DELIVERY WITH COMPLICATING DIAGNOSIS	Regional	159	142
499 PREMATURE LABOUR	Regional	141	101
585 GYNECOLOGICAL LAPAROSCOPY (MNRH)	Regional	128	124
377 MAJOR GYNECOLOGICAL PROCEDURES FOR OVARIAN OR ADENEX	Regional	104	98
486 VAGINAL DELIVERY WITH STIMULATION PROCEDURES	Regional	97	56
584 VAGINA, CERVIX AND VULVA PROCEDURES	Regional	88	77
412 ECTOPIC PREGNANCY WITH MAJOR PROCEDURES	Regional	69	65
419 FALSE LABOUR LOS < 5 DAYS (MNRH)	Regional	61	29
410 VAGINAL DELIVERY AFTER CAESAREAN DELIVERY (VAC)	Regional	60	44
386 TUBAL INTERRUPTION (MNRH)	Decentralized	333	307
423 ANTEPARTUM DIAGNOSIS WITH COMPLICATING DIAGNOSIS	Decentralized	265	136
396 MISCELLANEOUS GYNECOLOGICAL DIAGNOSIS (MNRH)	Decentralized	165	73
424 ANTEPARTUM DIAGNOSIS	Decentralized	140	70
422 POST PARTUM DIAGNOSIS	Decentralized	82	45
387 OTHER GYNECOLOGICAL PROCEDURES	Decentralized	57	41

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Obstetrics/Gynaecology – Patient Flow (RIW)

Patient came from		Treated at								
	Region	RHC1B	RHC1SE	RHC2	RHC3	RHC4	RHC5	RHC6	RHC7	Total
	1	1,037	1,521	4	5		3	3	15	2,588
	2	8	36	2,509	84				1	2,638
	3	13	8	39	2,643	34	4	3		2,744
	4	6	1	17	61	842	43	1	1	971
	5	25	12	2		5	474	35	1	549
	6	84	35	5	4	1	1	1,229	18	1,377
	7	53	51	11	8			38	824	986
	Other Provinces	14	156	8	9	46	140	4	3	379
Total	1,239	1,820	2,594	2,815	926	663	1,313	863	12,232	

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Obstetrics/Gynaecology – Regional Relative Utilization Rates

Region	Actual Cases	Expected Cases	Utilization Rate
1	2,470	2,804	0.88
2	2,534	2,691	0.94
3	2,642	2,520	1.05
4	942	821	1.15
5	529	472	1.12
6	1,324	1,358	0.97
7	948	723	1.31

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Obstetrics/Gynaecology - Distribution of Specialists Among Hospitals

Hospital	Number of Specialists	Specialists with >100 RIW	Avg. RIW for Specialists with > 100 RIW	Total RIWs for all Specialists
NB	42	33	296	10168
Saint John Regional Hospital	9	8	269	2209
Dr. Everett Chalmers Regional Hospital	9	6	313	2032
The Moncton Hospital	6	5	375	1949
Dr. Georges L. Dumont Hospital	5	4	222	957
Bathurst Regional Hospital	7	2	346	749
Miramichi Regional Hospital	3	3	216	648
Edmundston Regional Hospital	2	2	307	615
Campbellton Regional Hospital	1	1	469	469
Centre Hospitalier de Caraquet	1	1	258	258
Grand Falls General Hospital	1	1	202	202
The Oromocto Hospital	6	0	—	63
Sackville Memorial Hospital	3	0	—	15
The Carleton Memorial Hospital (Woodstock)	1	0	—	1

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Obstetrics/Gynaecology – Case Distribution of Program Among Specialists and Other Physicians

Hospital	Number of Physicians with RWs for Program	Number of Physicians with >50 RWs for Program	Number of Specialists with >50 RWs for Program	Average RWs for all Physicians	Average RWs for Specialists	RWs for Program
NH	258	43	38	218	258	11754
St. John Regional Hospital	41	9	5	237	237	2461
Dr. Everett Chalmers Regional Hospital	28	8	8	238	238	3090
The Moncton Hospital	50	5	6	246	246	1702
Dr. Georges L. Dumont Hospital	21	7	3	138	132	1184
Barbours Regional Hospital	23	3	2	237	330	330
Moncton Regional Hospital	23	3	2	207	207	827
Edmundston Regional Hospital	10	2	1	200	300	675
Comptondale Regional Hospital	18	2	1	234	234	319
Centre Hospitalier de Gaspé	11	1	1	234	234	319
The Charlton Memorial Hospital (Woodville)	14	3	0	—	—	299
The Charlton Memorial Hospital (Woodville)	9	1	0	95	—	254
Hotel Dieu de St. Joseph (Port-Audren)	8	1	1	112	112	211
Grand Falls General Hospital	8	1	1	112	112	211

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Obstetrics/Gynaecology – Scenario: All Regional Hospitals

Patient Case from Region	Dr. Georges Dumont	The Moncton Hospital	St. John Regional Hospital	Dr. Everett Chalmers Regional Hospital	Hopital Regional D. Edmundston	Comptondale Regional Hospital	Barbours Regional Hospital	The Moncton Hospital	Elsewhere	Total RW	Avg. Distance Travelled (km)
1 Actual RW	987	1,417	3	4		3	3	14	34	2,466	15
Scenario RW	998	1,420	3	5		3	3	14	20	2,466	15
2 Actual RW	8	34	2,378	78				1	31	2,530	28
Scenario RW	8	34	2,382	78				1	27	2,530	28
3 Actual RW	13	8	37	1,038	4	3	3		632	2,639	33
Scenario RW	14	8	41	1,051	100	3	3		420	2,639	33
4 Actual RW	6	1	17	13	690	41		1	230	936	37
Scenario RW	6	1	17	12	708	46		1	87	936	43
5 Actual RW	22	11	2		2	451	33	1	5	526	36
Scenario RW	22	11	2		3	451	33	1	3	526	36
6 Actual RW	82	34	3	4	1	1	857	18	322	1,323	35
Scenario RW	83	34	3	4	1	1	1,113	18	83	1,323	36
7 Actual RW	52	30	11	8			31	790	4	948	39
Scenario RW	52	30	11	8			31	794	2	948	39
Total Actual RW	1,184	1,702	2,461	2,090	679	613	790	827	1,268	11,733	31
Scenario RW	1,197	1,708	2,469	2,163	913	639	1,187	832	675	11,733	33
Family Practice RW	394	204	268	67	71	172	203	175	543	2,137	
PTE Actual	2.7	3.0	7.4	4.7	2.0	1.6	2.4	2.2	2.3	32.3	
PTE Scenario	2.7	3.1	7.4	7.1	2.8	1.8	3.3	2.2	0.1	32.3	

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**Obstetrics/Gynaecology –
Scenario: Base Hospitals plus
Edmundston, Bathurst, and Miramichi**

Patient Came from Region		Dr. Georges Dumont	The Moncton Hospital	Saint John Regional Hospital	Dr. Everett Chalmers Hospital	Hopital Regional D. Edmundston	Bathurst Regional Hospital	The Miramichi Hospital	Elsewhere	Total RIW	Avg. Distance Travelled (km)
1	Actual RIW	987	1,417	3	4	0	3	14	37	2,466	13
	Scenario RIW	1,006	1,420	3	5	0	3	14	21	2,466	15
2	Actual RIW	8	34	2,378	78	0	0	5	31	2,530	28
	Scenario RIW	8	34	2,385	78	0	0	5	27	2,530	28
3	Actual RIW	13	8	37	1,938	4	3	0	635	2,639	33
	Scenario RIW	14	8	41	2,051	100	5	0	420	2,639	37
4	Actual RIW	6	1	17	11	630	0	1	271	936	37
	Scenario RIW	6	1	17	12	801	0	1	99	936	44
5	Actual RIW	22	11	2	0	2	33	1	433	526	36
	Scenario RIW	23	11	2	1	7	364	1	118	526	80
6	Actual RIW	82	34	5	4	1	857	18	322	1,323	53
	Scenario RIW	83	34	5	4	1	1,114	18	63	1,323	63
7	Actual RIW	52	50	11	8	0	31	796	0	948	39
	Scenario RIW	52	50	11	8	0	31	794	0	948	39
Total	Actual RIW	1,184	1,702	2,461	2,050	679	930	827	1,301	11,733	31
	Scenario RIW	1,199	1,797	2,469	2,164	950	1,523	832	796	11,733	35
Family Practice RIW		394	204	268	67	71	203	175	733	2,137	
FTE Actual		2.7	5.1	7.3	6.8	2.1	2.5	2.2	3.9	33.0	
FTE Scenario		2.4	5.5	7.6	7.2	3.0	4.3	2.3	0.2	33.0	

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**Obstetrics/Gynaecology –
Scenario: Base Hospitals plus
Edmundston and Bathurst**

Patient Came from Region		Dr. Georges Dumont	The Moncton Hospital	Saint John Regional Hospital	Dr. Everett Chalmers Hospital	Hopital Regional D. Edmundston	Bathurst Regional Hospital	Elsewhere	Total RIW	Avg. Distance Travelled (km)
1	Actual RIW	987	1,417	3	4	0	3	51	2,466	13
	Scenario RIW	1,008	1,420	3	5	0	8	22	2,466	14
2	Actual RIW	8	34	2,378	78	0	0	32	2,530	28
	Scenario RIW	8	34	2,385	78	0	0	27	2,530	28
3	Actual RIW	13	8	37	1,938	4	3	635	2,639	33
	Scenario RIW	14	8	41	2,051	100	5	420	2,639	37
4	Actual RIW	6	1	17	11	630	0	272	936	37
	Scenario RIW	6	1	17	12	801	1	99	936	44
5	Actual RIW	22	11	2	0	2	33	456	526	36
	Scenario RIW	23	11	2	1	7	365	118	526	80
6	Actual RIW	82	34	5	4	1	857	340	1,323	53
	Scenario RIW	84	34	5	4	1	1,128	66	1,323	63
7	Actual RIW	52	50	11	8	0	31	796	948	39
	Scenario RIW	60	50	12	51	0	589	176	948	81
Total	Actual RIW	1,184	1,702	2,461	2,050	679	930	2,728	11,733	31
	Scenario RIW	1,225	1,797	2,471	2,208	950	2,105	977	11,733	39
Family Practice RIW		394	204	268	67	71	203	929	2,137	
FTE Actual		2.7	5.2	7.6	6.9	2.1	2.5	6.2	33.2	
FTE Scenario		2.9	5.5	7.6	7.4	3.0	6.6	0.2	33.2	

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Obstetrics – Scenario: All Regional Hospitals

Patient Came from Region	Dr. Georges Dumas	The Musicians Hospital	Saint John Regional Hospital	Dr. Everett Chalmers Hospital	Hopital Regional D. Edmonstone	Campbellton Regional Hospital	Bathurst Regional Hospital	The Musicians Hospital	Elsewhere	Total R/W	Avg. Distance Travelled (km)
1 Actual R/W	548	472	2	1		1	1	0	10	1,454	14
Scenario R/W	548	472	2	1		1	1	0	10	1,454	14
2 Actual R/W	4	26	1,190	18				1	11	1,279	21
Scenario R/W	4	26	1,190	18				1	11	1,279	21
3 Actual R/W	2	1	13	1,137	2	1	1		408	1,558	29
Scenario R/W	2	1	13	1,137	2	1	1		408	1,558	29
4 Actual R/W	5	1	4	7	253	23		1	145	443	31
Scenario R/W	5	1	4	7	253	23		1	443	443	31
5 Actual R/W	1	8	2			233	9		2	244	32
Scenario R/W	1	8	2			233	9		2	244	32
6 Actual R/W	18	31	3	1			471	5	185	696	60
Scenario R/W	18	31	3	1			471	5	696	696	60
7 Actual R/W	11	35	1	2			39	402	3	537	68
Scenario R/W	11	35	1	2			39	402	3	537	68
Total Actual R/W	992	1,293	1,422	1,191	278	313	503	479	761	8,801	129
Scenario R/W	992	1,293	1,422	1,191	278	313	503	479	761	8,801	129
Family Practice R/W	392	301	264	52	46	136	170	156	131	2,036	31
PTD Actual	1.5	1.4	7.5	8.7	1.4	1.1	2.0	2.0	1.8	31.1	
PTD Scenario	1.5	1.4	7.5	8.8	2.0	1.1	2.7	2.1	0.9	31.1	

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Gynaecology – Scenario: All Regional Hospitals

Patient Came from Region	Dr. Georges Dumas	The Musicians Hospital	Saint John Regional Hospital	Dr. Everett Chalmers Hospital	Hopital Regional D. Edmonstone	Campbellton Regional Hospital	Bathurst Regional Hospital	The Musicians Hospital	Elsewhere	Total R/W	Avg. Distance Travelled (km)
1 Actual R/W	439	344	2	3		2	2	5	13	1,032	16
Scenario R/W	439	344	2	3		2	2	5	13	1,032	16
2 Actual R/W	4	8	989	40				16	13	1,036	21
Scenario R/W	4	8	989	40				16	13	1,036	21
3 Actual R/W	11	5	24	402	1	2	1	224	472	499	39
Scenario R/W	11	5	27	498	1	2	1	224	472	499	39
4 Actual R/W	2		13	4	375	16		81	492	499	39
Scenario R/W	2		13	4	403	16		100	492	499	39
5 Actual R/W	22	3			2	228	24	1	3	382	40
Scenario R/W	22	3			2	228	24	1	3	382	40
6 Actual R/W	67	4		1	1		186	12	137	428	60
Scenario R/W	67	4		1	1		186	12	137	428	60
7 Actual R/W	41	12	10	3			12	128	3	411	40
Scenario R/W	41	12	10	3			12	128	3	411	40
Total Actual R/W	591	647	1,039	636	401	321	423	348	901	4,936	54
Scenario R/W	591	647	1,039	636	401	321	423	348	901	4,936	54
Family Practice R/W	2	1	2	3	6	22	8	9	48	102	16
PTD Actual	4.1	4.3	7.2	4.3	2.7	2.1	2.9	2.4	3.1	33.3	
PTD Scenario	4.2	4.3	7.3	5.2	3.7	2.1	3.9	2.4	0.3	33.3	

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Cardiology – Program Description

CMG	CMG Description	Dimension of Distribution	Total RIW	RIWs for Specialists
218	CARDIAC CATH WITHOUT SPECIFIED CARDIAC CONDITIONS	Centralized	974	980
189	PERCUTANEOUS TRANSLUMINAL CORONARY ANGIOPLASTY W/O	Centralized	615	907
198	PERCUTANEOUS TRANSLUMINAL CORONARY ANGIOPLASTY W CO	Centralized	461	460
204	ANG WITH CARDIAC CATH WITHOUT SPECIFIED CARDIAC CON	Centralized	86	85
215	CARDIAC CATH WITH CONGESTIVE HEART FAILURE	Centralized	74	66
211	UNSTABLE ANGINA WITH CARDIAC CATH WITHOUT SPECIFIED	Centralized	56	50
186	PERMANENT PACEMAKER IMPLANT WITHOUT SPECIFIED CARDI	Regional	885	408
229	ATHEROSCLEROSIS MINOR	Regional	649	146
207	ANG WITHOUT CARDIAC CATH WITH ANGINA	Regional	263	57
185	PERMANENT PACEMAKER IMPLANT FOR SPECIFIED CARDIAC C	Regional	228	120
200	ANG, UNSTABLE ANGINA OR CARDIAC CATH WITH SHOCK OR	Regional	126	90
206	ANG WITHOUT CARDIAC CATH WITH VENTRICULAR TACHYCARD	Regional	107	14
193	CARDIAC PACEMAKER DEVICE REPLACEMENT OR REVISION	Regional	98	71
191	TEMPORARY CARDIAC PACEMAKER	Regional	86	30
213	UNSTABLE ANGINA WITHOUT CARDIAC CATH WITHOUT SPECIF	Decentralized	1766	148
208	ANG WITHOUT CARDIAC CATH WITHOUT SPECIFIED CARDIAC	Decentralized	1689	230
242	CHEST PAIN	Decentralized	1267	168
205	ANG WITHOUT CARDIAC CATH WITH CONGESTIVE HEART FAIL	Decentralized	887	144
212	UNSTABLE ANGINA WITHOUT CARDIAC CATH WITH SPECIFIED	Decentralized	285	46
232	ACQUIRED VALVULAR DISORDERS MINOR	Decentralized	122	24

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Cardiology – Patient Flow (RIW)

Patient came from	Region	Treated at							Total
		RHC1B	RHC1SE	RHC2	RHC3	RHC4	RHC5	RHC6	
1		814	1,306	319	4	1		5	2,448
2			21	2,080	23			2	2,129
3		2	11	420	2,074	16	1	1	2,527
4		1		101	36	692	1	1	832
5		2	5	86	1	1	363	20	480
6		30	4	144	2	1	15	819	1,014
7		52	17	165	1		1	32	981
Other Provinces		38	25	166	12	22	103	12	385
Total		940	1,390	3,479	2,154	732	483	886	10,796

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Cardiology: Regional Relative Utilization Rates

Region	Actual Cases	Expected Cases	Utilization Rate
1	2,443	2,664	0.92
2	2,132	2,516	0.85
3	2,521	2,170	1.16
4	833	723	1.15
5	476	477	1.00
6	1,027	1,178	0.87
7	965	668	1.45

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Cardiology: Distribution of Specialists Among Hospitals

Hospital	Number of Specialists	Specialists with >100 RIW	Avg. RIW for Specialists with >100 RIW	Total RIWs for all Specialists
NB	17	13	366	3544
Saint John Regional Hospital	8	8	425	3397
Dr. Georges L. Dumont Hospital	4	3	364	1125
Bathurst Regional Hospital	1	1	464	464
The Moncton Hospital	3	2	142	312
Edmundston Regional Hospital	1	1	245	245

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Cardiology: Case Distribution of Program Among Specialists and Other Physicians

Hospital	Number of Physicians with RIWs for Program	Number of Physicians with RIWs for Program	Number of Specialists with RIWs for Program	Average RIWs for all Physicians	Average RIWs for Specialists	RIWs for Program
NR	463	77	15	158	184	10,779
St. John Regional Hospital	73	8	8	145	145	3,094
The Mission Hospital	47	3	2	76	103	1,278
Dr. Everett Chalmers Regional Hospital	18	4	0	186	—	1,351
Dr. George L. Dunsmuir Hospital	24	3	0	124	116	920
Alouette Regional Hospital	52	5	0	42	—	718
Burnside Regional Hospital	17	4	1	134	229	715
Edmonton Regional Hospital	31	1	1	81	—	587
Campbellton Regional Hospital	17	0	0	—	—	167
The Cardiac Memorial Hospital (Northwest)	13	0	0	—	—	147
Summit Health Centre	8	0	0	—	—	187
Charlotte County Hospital (St. John's)	14	0	0	—	—	178
The Quinlan Hospital	11	0	0	—	—	143
Hopital G. de St. Joseph (St. Andrews)	4	0	0	—	—	144
Providence Cardiac Hospital (Bath)	3	1	0	14	—	119
St. Joseph Hospital (Dukestown)	11	0	0	—	—	115

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Cardiology – Scenario: All Regional Hospitals

Patient Came from Region	Dr. George Dunsmuir	The Mission Hospital	St. John Regional Hospital	Dr. Everett Chalmers Regional Hospital	Hopital Regional D. Edmonton	Campbellton Regional Hospital	Bathurst Regional Hospital	The Miramichi Hospital	The Cardiac Memorial Hospital	Elsewhere	Total RIW	Avg. Distance Traveled (km)
1 Actual RIW	792	1,201	316	2				3	2	113	2,430	42
Scenario RIW	792	1,201	316	2				5	2	113	2,430	42
2 Actual RIW		21	1,702	12				2	1	1	1,844	31
Scenario RIW		21	1,702	12				2	1	1	1,844	31
3 Actual RIW	2	10	421	1,228	8			1	2	142	3,031	34
Scenario RIW	2	10	421	1,228	8			1	2	142	3,031	34
4 Actual RIW	1		100		159	1	1		1	159	822	86
Scenario RIW	1		100		159	1	1		1	159	822	86
5 Actual RIW	2	3	86	1	1	249	20	2		108	475	112
Scenario RIW	2	3	86	1	1	249	20	2		108	475	112
6 Actual RIW	30	4	144	1	1	14	661			154	1,099	99
Scenario RIW	30	4	144	1	1	14	661			154	1,099	99
7 Actual RIW	34	14	164	1		1	22	699		10	765	84
Scenario RIW	34	14	164	1		1	22	699		10	765	84
Total Actual RIW	920	1,278	1,094	1,232	187	362	715	718	347	1,449	10,730	60
Scenario RIW	920	1,278	1,094	1,232	187	362	715	718	347	1,449	10,730	60
Family Practice RIW	63	150	202	417	150	321	97	482	320	1,430	4,018	
FTS Actual	2.8	2.4	9.3	2.7	1.4		2.0	0.8			22.0	
FTS Scenario	2.8	2.4	9.3	2.7	1.4		2.0	0.8			22.0	

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Cardiology – Scenario: Base Hospitals plus Edmundston and Bathurst

Patient Came from Region		Dr. Georges Dumont	The Moncton Hospital	Saint John Regional Hospital	Dr. Everett Chalmers Hospital	Hospital Regional D. Edmundston	Bathurst Regional Hospital	Elsewhere	Total RIW	Avg. Distance Travelled (km)
1	Actual RIW	792	1,201	316	2			137	2,438	42
	Scenario RIW	792	1,201	316	2			137	2,438	42
2	Actual RIW		31	1,762	32		2	188	2,125	31
	Scenario RIW		31	1,708	32		2	182	2,125	31
3	Actual RIW	2	10	421	1,228	5	1	845	2,512	54
	Scenario RIW	2	10	421	1,242	5	1	829	2,512	54
4	Actual RIW	1		100		339	1	161	822	86
	Scenario RIW	1		100		339	1	160	822	86
5	Actual RIW	2	3	86	1	1	20	369	475	113
	Scenario RIW	2	3	86	1	1	31	345	475	114
6	Actual RIW	30	4	144	1	1	661	164	1,008	99
	Scenario RIW	30	4	144	1	1	574	153	1,008	98
7	Actual RIW	54	14	164	1		22	708	965	94
	Scenario RIW	56	14	164	2		68	660	965	96
Total	Actual RIW	920	1,278	1,894	1,252	367	715	2,875	10,720	90
	Scenario RIW	921	1,278	1,113	1,267	368	789	2,763	10,720	90
Family Practice RIW		61	550	202	417	150	97	2,558	4,038	
FTE Actual		2.8	2.4	9.5	2.7	1.4	2.0	1.0	22.9	
FTE Scenario		2.8	2.4	9.6	2.8	1.4	2.3	0.7	22.9	

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Cardiology – Scenario: Base Hospitals plus Bathurst (Centralized and Regional Cases only)

Patient Came from Region		Dr. Georges Dumont	The Moncton Hospital	Saint John Regional Hospital	Dr. Everett Chalmers Hospital	Bathurst Regional Hospital	Elsewhere	Total RIW	Avg. Distance Travelled (km)
1	Actual RIW	272	202	312	0	0	13	799	108
	Scenario RIW	272	202	312	0	0	13	799	108
2	Actual RIW	0	4	1,178	0	0	47	1,229	31
	Scenario RIW	0	4	1,184	0	0	41	1,229	31
3	Actual RIW	0	3	406	309	1	175	894	104
	Scenario RIW	0	3	406	320	1	155	894	105
4	Actual RIW	1	0	97	0	1	228	327	194
	Scenario RIW	1	0	97	24	125	82	327	243
5	Actual RIW	0	2	85	0	10	79	176	257
	Scenario RIW	0	2	85	0	25	64	176	262
6	Actual RIW	23	3	143	1	314	39	543	144
	Scenario RIW	23	3	143	1	327	46	543	142
7	Actual RIW	40	4	157	0	12	120	333	175
	Scenario RIW	42	4	157	1	39	71	333	182
Total	Actual RIW	350	230	2,532	314	340	744	4,518	115
	Scenario RIW	360	230	2,556	358	536	477	4,518	120
Family Practice RIW		18	67	66	86	43	477	758	
FTE Actual		1.4	0.7	9.9	0.9	1.2	1.1	15.0	
FTE Scenario		1.4	0.7	9.9	1.1	2.0	0.0	15.0	

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Psychiatry – Program Description

CMG	CMG Description	Dimension of Distribution	Total RIW	RIWs for Specialists
777	SCHIZOPHRENIA AND OTHER PSYCHOTIC DISORDERS W/O ECT	Regional	1093	1023
764	DEPRESSIVE MOOD DISORDERS WITH ECT	Regional	594	589
776	SCHIZOPHRENIA AND OTHER PSYCHOTIC DISORDERS W/O ECT	Regional	565	544
770	BIPOLAR MOOD DISORDERS, MANIC WITHOUT ECT WITHOUT A	Regional	485	413
769	BIPOLAR MOOD DISORDERS, MANIC WITHOUT ECT WITH AXIS	Regional	287	224
767	DEPRESSIVE MOOD DISORDERS LOS < 6 DAYS	Regional	194	102
809	OBSOLETE PSYCHIATRIC DIAGNOSES (MNRH)	Regional	170	79
787	EATING DISORDERS	Regional	164	74
786	DISRUPTIVE BEHAVIOUR DISORDERS	Regional	160	94
775	SCHIZOPHRENIA AND OTHER PSYCHOTIC DISORDERS WITH EC	Regional	140	130
794	PERSONALITY DISORDERS WITHOUT AXIS III DIAGNOSIS (M	Regional	131	111
797	MISCELLANEOUS PSYCHIATRIC DIAGNOSES (MNRH)	Regional	105	94
768	BIPOLAR MOOD DISORDERS, MANIC WITH ECT	Regional	102	102
766	DEPRESSIVE MOOD DISORDERS WITHOUT ECT WITHOUT AXIS	Decentralized	1409	947
765	DEPRESSIVE MOOD DISORDERS WITHOUT ECT WITH AXIS III	Decentralized	772	462
792	ADJUSTMENT DISORDERS (MNRH)	Decentralized	447	335
791	ANXIETY DISORDERS (MNRH)	Decentralized	221	89
783	PSYCHOACTIVE SUBSTANCE DEPENDENCE	Decentralized	184	58

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Psychiatry – Patient Flow (RIW)

	Region	Treated at							Total
		RHC1B	RHC1SE	RHC2	RHC3	RHC4	RHC5	RHC6	
Patients came from	1	808	1,050	1	2		29	3	1,906
	2		40	983	42		10	1	1,076
	3	3	36	9	1,301	14	26	6	1,394
	4	2	5		67	761	63	2	900
	5	9	2				635	7	652
	6	6	15		3	1	32	1,159	1,215
	7	19	17	3	17		6	18	528
	Other Provinces	19	30	2	21	18	72	4	177
	Total	866	1,196	998	1,454	793	871	1,201	7,848

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Psychiatry – Regional Relative Utilization Rates

Region	Actual Cases	Expected Cases	Utilization Rate
1	1,877	1,868	1.00
2	1,060	1,776	0.60
3	1,355	1,614	0.84
4	900	552	1.63
5	625	329	1.90
6	1,196	900	1.33
7	506	480	1.05

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Psychiatry – Distribution of Specialists Among Hospitals

Hospital	Number of Specialists	Specialists with >100 RIW	Avg. RIW for Specialists with > 100 RIW	Total RIWs for all Specialists
NB	49	27	183	5722
Bathurst Regional Hospital	6	3	327	997
Dr. Everett Chalmers Regional Hospital	7	4	197	941
The Moncton Hospital	7	4	199	907
Saint John Regional Hospital	12	4	123	738
Dr. Georges L. Dumont Hospital	5	3	216	608
Campbellton Regional Hospital	6	1	105	524
Edmundston Regional Hospital	3	2	215	444
Nunavut Regional Hospital	3	3	118	353
Restigouche Hospital Centre (Campbellton)	6	0	—	120

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Psychiatry – Cases Distribution of Program Among Specialists and Other Physicians

Hospital	Number of Physicians with R/Ws for Program	Number of Physicians with >50 R/Ws for Program	Number of Specialists with >50 R/Ws for Program	Average R/Ws for all Physicians	Average R/Ws for Specialists	R/Ws for Program
NB	34	27	27	178	178	7414
The Moncton Hospital	51	4	4	187	187	1114
Dr. Everett Chalmers Regional Hospital	42	4	4	181	181	1066
Barbours Regional Hospital	15	1	1	114	114	1017
Saint John Regional Hospital	58	4	4	117	117	847
Dr. Georges L. Dumont Hospital	52	1	1	209	209	828
Edmundston Regional Hospital	27	2	2	205	205	690
Cambridge Regional Hospital	21	1	1	102	102	588
Moncton Regional Hospital	22	1	1	114	114	445
Mount Carmel St. Joseph (Fleurbaey)	6	0	0	—	—	147
St. Joseph Hospital (Dieppe)	10	0	0	—	—	151
Restegouche Hospital (near Cambridge)	8	0	0	—	—	120

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Psychiatry – Scenario: All Regional Hospitals

Patient Came from Region	Dr. Georges Dumont Hospital	The Moncton Hospital	Saint John Regional Hospital	Dr. Everett Chalmers Hospital	Hopital Regional D. Edmundston	Cambridge Regional Hospital	Barbours Regional Hospital	The Moncton Hospital	Elsewhere	Total R/W	Avg Distance Travelled (km)
1 Actual R/W	770	981	1	2	0	0	3	11	102	1,871	14
Scenario R/W	760	1,000	1	2	0	0	3	11	73	1,871	14
2 Actual R/W	0	38	851	28	0	0	1	0	134	1,053	32
Scenario R/W	0	38	848	28	0	2	1	0	138	1,053	32
3 Actual R/W	3	35	9	983	8	2	6	0	806	1,350	37
Scenario R/W	3	35	9	988	11	2	6	0	780	1,350	36
4 Actual R/W	2	4	0	14	666	30	2	0	130	887	27
Scenario R/W	2	4	1	14	681	30	2	0	134	887	27
5 Actual R/W	9	2	0	0	0	457	7	0	149	624	18
Scenario R/W	9	2	0	0	0	459	8	0	125	624	18
6 Actual R/W	6	13	0	3	0	13	1,003	0	134	1,594	40
Scenario R/W	6	13	0	3	0	13	1,022	0	117	1,594	40
7 Actual R/W	19	14	2	17	0	1	94	420	14	806	37
Scenario R/W	19	14	2	17	0	1	10	434	9	800	36
Total Actual R/W	826	1,114	847	1,066	670	588	1,037	445	1,043	7,662	29
Scenario R/W	818	1,133	853	1,081	706	616	1,058	454	910	7,662	29
Family Practice Actual	102	194	47	122	251	74	63	103	870	1,872	
71% Actual	2.7	3.5	2.9	3.5	1.6	1.8	3.7	1.3	0.4	21.7	
77% Scenario	2.8	3.5	3.0	3.6	1.7	2.0	3.7	1.3	0.1	21.7	

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Paediatrics – Specialist Activity

Cases among patients <16 years old

CMG	CMG Description	Program	Dimension of Distribution	Total RIW	RIW for Specialists
294	Eaophagus, gastroenteritis, and miscellaneous disease	Family Practice	Primary	665	189
645	Neonates weight >2500 GM with moderate problems	Neonatology	Secondary	359	158
143	Simple pneumonia and pleurisy	Family Practice	Primary	385	151
145	Tracheobronchitis	Family Practice	Primary	465	146
146	Asthma	Family Practice	Primary	308	132
646	Neonates weight >2500 GM with caesarian delivery	Family Practice	Secondary	463	129
648	Neonates weight >2500 GM (Normal Newborn)	Family Practice	Secondary	663	109
647	Neonates weight >2500 GM with minor problems	Neonatology	Secondary	298	108

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Paediatrics – Distribution of Specialists Among Hospitals

Hospital	Number of Specialists	Specialists with RIW > 100	Avg RIW for Specialists with RIW > 100	Total RIW for all Specialists
NB	33	13	153	2783
The Moncton Hospital	4	4	154	617
Saint John Regional Hospital	6	3	134	535
Dr. Everett Chalmers Regional Hospital	6	2	144	395
Bathurst Regional Hospital	5	2	157	380
Dr. Georges L. Dumont Hospital	8	1	165	355
Campbellton Regional Hospital	1	1	246	246
Edmundston Regional Hospital	3	0		231
Miramichi Regional Hospital	1	0		24

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Paediatrics – Regional Relative Utilization Rates (of MD service)

Region	Actual RIW	Expected RIW	Utilization Rate
1	784	610	1.29
2	539	687	0.78
3	384	622	0.62
4	252	174	1.45
5	176	100	1.76
6	429	275	1.56
7	66	162	0.41

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Orthopaedic Surgery – Program Description

CMG - CMG Description	Dimension of Distribution	Total RIW	RIWs for Specialists
363 BACK AND NECK PROCEDURES WITH FUSION	Centralized	627	412
350 MULTIPLE OR BILATERAL JOINT REPLACEMENT	Centralized	115	115
354 KNEE REPLACEMENT	Regional	1,654	1,644
642 FEMUR OR PELVIC PROCEDURES FOR TRAUMA	Regional	1,348	1,416
352 HIP REPLACEMENT	Regional	1,268	1,248
666 MAJOR LOWER EXTREMITY PROCEDURES FOR TRAUMA	Regional	362	727
360 OTHER LOWER EXTREMITY PROCEDURES (MNRH)	Regional	723	713
403 EXTENSIVE PROCEDURES FOR INJURY OR COMPLICATION	Regional	323	160
470 UPPER EXTREMITY PROCEDURES FOR TRAUMA	Regional	516	410
374 MINOR LOWER EXTREMITY PROCEDURES	Regional	513	498
375 MINOR UPPER EXTREMITY PROCEDURES	Regional	370	344
379 OTHER MUSCULOSKELETAL PROCEDURES (MNRH)	Regional	185	151
369 MAJOR LOWER EXTREMITY PROCEDURES	Regional	182	177
351 JOINT REPLACEMENT FOR TRAUMA	Regional	173	162
356 REPAIR HIP AND FEMUR PROCEDURES	Regional	171	136
382 ARTHROSCOPY (MNRH)	Regional	122	122
658 FEMUR PROCEDURES WITH WOUND DEBRIDEMENT OR LO	Regional	99	93
358 LOWER EXTREMITY PROCEDURES WITH INFECTION	Regional	84	42
644 FRACTURE OF HUMERUS	Regional	82	16
372 MAJOR UPPER EXTREMITY PROCEDURES	Regional	79	73
368 MAJOR HIP AND KNEE PROCEDURES	Regional	78	77
367 SHOULDER ARTHROPLASTY	Regional	66	62
653 INTRACRANIAL OR FEMUR PROCEDURES WITH THORACO-	Regional	57	56
407 OTHER MUSCULOSKELETAL DISORDERS	Regional	51	14
696 UPPER EXTREMITY FRACTURES	Decentralized	182	100
648 WEIGHT BEARING INJURIES	Decentralized	109	58
397 OSTEOMYELITIS	Decentralized	92	13

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Orthopaedic Surgery – Patient Flow (RIW)

Patient came from	Region	Treated at								Total
		RHC1B	RHC1SE	RHC2	RHC3	RHC4	RHC5	RHC6	RHC7	
1		845	1,503	21	10			3	1	2,383
2		5	37	2,406	161			2		2,611
3		1	26	210	2,281	15	3	6	2	2,545
4		2	14	12	31	582	1	2	1	646
5		16	30	5	1	9	215	108	17	402
6		00	68	15	8		33	598	44	827
7		45	70	17	57		5	49	392	637
Other Provinces		104	249	26	32	62	45	7	6	530
Total		1,080	1,997	2,713	2,582	668	303	774	463	10,580

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Orthopaedic Surgery – Regional Relative Utilization Rates

Region	Actual Cases	Expected Cases	Utilization Rate
1	2,374	2,557	0.93
2	2,614	2,444	1.07
3	2,550	2,135	1.19
4	679	715	0.95
5	412	456	0.9
6	831	1,149	0.72
7	640	645	0.99

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Orthopaedic Surgery – Distribution of Specialists Among Hospitals

Hospital	Number of Specialists	Specialists with >100 RIW	Avg. RIW for Specialists with > 100 RIW	Total RIWs for all Specialists
NB	30	26	397	10569
Saint John Regional Hospital	6	5	318	2639
Dr. Everett Chalmers Regional Hospital	7	6	350	2173
The Moncton Hospital	5	4	496	1984
Dr. Georges L. Dumont Hospital	4	4	250	1001
Bathurst Regional Hospital	3	3	258	773
Edmundston Regional Hospital	3	2	346	769
Miramichi Regional Hospital	1	1	526	527
Campbellton Regional Hospital	1	1	318	318
The Oromocto Hospital	7	0	—	276
Sackville Memorial Hospital	3	0	—	32
Centre Hospitalier de Caraquet	3	0	—	21
Sussex Health Centre	1	0	—	21
Charlotte County Hospital (St. Stephen)	1	0	—	14
Grand Falls General Hospital	0	0	—	1

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Orthopaedic Surgery – Distribution of Program Among Specialists and Other Physicians

Hospital	Number of Physicians with RIWs for Program	Number of Physicians with >50 RIWs for Program	Number of Specialists with >50 RIWs for Program	Average RIWs for all Physicians	Average RIWs for Specialists	RIWs for Program
NB	248	32	29	271	313	10630
Saint John Regional Hospital	53	7	6	329	375	2638
Dr. Everett Chalmers Regional Hospital	40	7	7	280	280	2190
The Moncton Hospital	39	4	4	433	433	1945
Dr. Georges L. Dumont Hospital	28	4	4	227	227	1078
Bathurst Regional Hospital	18	3	3	218	218	732
Edmundston Regional Hospital	10	3	3	206	206	631
Miramichi Regional Hospital	13	1	1	189	189	464
Campbellton Regional Hospital	10	1	1	270	270	297
The Oromocto Hospital	14	1	1	34	34	284

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Orthopaedic Surgery – Scenario: All Regional Hospitals

Patient Came from Region	Dr. Georges Dumont	The Moncton Hospital	Saint John Regional Hospital	Dr. Everett Chalmers Regional Hospital	Hopital Regional D. Edmundston	Compton Regional Hospital	Bathurst Regional Hospital	The Miramichi Hospital	Elsewhere	Total RIW	Avg. Distance Travelled (km)
1 Actual RIW	845	1,459	17	8			3	0	32	2,366	18
Scenario RIW	866	1,468	17	8			3	0	29	2,366	16
2 Actual RIW	5	36	2,338	142					79	2,603	30
Scenario RIW	6	36	2,384	143					29	2,603	30
3 Actual RIW	1	26	208	1,920	16	6	2	365		2,343	55
Scenario RIW	12	26	213	2,209	38	8	2	47		2,543	51
4 Actual RIW	2	13	12	27	372	2	1	17		645	52
Scenario RIW	2	13	12	27	378	2	1	10		645	49
5 Actual RIW	16	30	5	1	9	108	233		51	402	66
Scenario RIW	16	30	5	1	9	108	233		40	402	60
6 Actual RIW	60	68	15	7		559	118	44	81	826	63
Scenario RIW	60	68	15	7		559	118	44	20	826	61
7 Actual RIW	44	70	17	54		47	393	6	636	58	
Scenario RIW	44	70	17	54		47	393	6	536	54	
Total Actual RIW	1,078	1,943	2,638	2,190	659	732	1,308	947	10,550	43	
Scenario RIW	1,110	1,963	2,689	2,493	680	754	1,353	1,114	10,550	44	
Family Practice RIW	35	37	119	60	6	32	188		481		
PTE Actual	2.9	5.3	7.0	5.9	1.8	1.9	3.1	1.2	27.8		
PTE Scenario	3.0	5.4	7.1	6.7	1.9	2.0	3.1	0.9	27.8		

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Orthopaedic Surgery – Scenario: Base Hospitals plus Edmundston and Bathurst

Patient Came from Region	Dr. Georges Dumont	The Moncton Hospital	Saint John Regional Hospital	Dr. Everett Chalmers Regional Hospital	Hopital Regional D. Edmundston	Bathurst Regional Hospital	Elsewhere	Total RIW	Avg. Distance Travelled (km)
1 Actual RIW	845	1,459	17	8		3	33	2,366	18
Scenario RIW	867	1,468	17	8		3	29	2,366	16
2 Actual RIW	5	36	2,338	142		2	79	2,603	30
Scenario RIW	6	36	2,384	143		2	29	2,603	30
3 Actual RIW	1	26	208	1,920	16	6	365	2,343	55
Scenario RIW	12	26	213	2,209	38	8	47	2,543	51
4 Actual RIW	2	13	12	27	372	2	17	645	52
Scenario RIW	2	13	12	27	380	2	10	645	49
5 Actual RIW	16	30	5	1	9	108	233	402	66
Scenario RIW	16	31	5	1	10	118	20	402	60
6 Actual RIW	60	68	15	7		559	118	826	63
Scenario RIW	62	68	16	7		553	21	826	61
7 Actual RIW	44	70	17	54		47	404	636	58
Scenario RIW	46	70	17	54		47	361	636	54
Total Actual RIW	1,078	1,943	2,638	2,190	659	732	1,308	10,550	43
Scenario RIW	1,125	2,009	2,689	2,493	680	753	201	10,550	44
Family Practice RIW	35	37	119	60	6	32	188	481	
PTE Actual	2.9	5.3	7.0	5.9	1.8	1.9	3.1	27.8	
PTE Scenario	3.0	5.4	7.1	6.7	1.9	2.0	3.1	27.8	

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Urology – Program Description

CMG	CMG Description	Dimension of Distribution	Total RIW	RIWs for Specialists
501	URINARY DIVERSION AND AUGMENTATION	Centralized	171	159
512	OTHER TRANSURETHRAL OR BIOPSY PROCEDURES (MNRH)	Regional	662	626
510	TRANSURETHRAL PROSTATECTOMY	Regional	567	544
846	AFTERCARE FOLLOWING SURGERY OR TREATMENT	Regional	375	143
504	MAJOR URINARY TRACT PROCEDURES	Regional	324	296
502	RADICAL PROSTATECTOMY	Regional	245	242
508	MINOR UPPER URINARY TRACT PROCEDURES	Regional	171	158
563	MISCELLANEOUS MALE REPRODUCTIVE SYSTEM DIAGNOSES (MNRH)	Regional	149	113
509	MINOR LOWER URINARY TRACT PROCEDURES	Regional	119	110
554	MISCELLANEOUS MALE REPRODUCTIVE SYSTEM PROCEDURES	Regional	80	70
505	RECONSTRUCTIVE UROLOGICAL PROCEDURES	Regional	75	51
552	TESTES PROCEDURES	Regional	72	60
536	URINARY OBSTRUCTION (MNRH)	Decentralized	1,013	761
522	URINARY NEOPLASM	Decentralized	344	115
534	MISCELLANEOUS UROLOGICAL DIAGNOSES (MNRH)	Decentralized	274	186
532	URINARY RETENTION AND OTHER FUNCTIONAL DISORDERS OF	Decentralized	183	125
535	HEMATURIA (MNRH)	Decentralized	157	112
555	CIRCUMCISION (MNRH)	Decentralized	68	58

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Urology – Patient Flow (RIW)

Patient came from	Region	Treated at								Total
		RHC1B	RHC1SE	RHC2	RHC3	RHC4	RHC5	RHC6	RHC7	
1		633	622	26	2			1	2	1,286
2		1	8	1,092	47					1,148
3			1	106	1,070	10			2	1,189
4		9		5	18	263	9			305
5		26	7	17	1	1	175	38	3	268
6		66	5	10	1		8	431	13	533
7		18	5	4	7			13	260	308
Other Provinces		23	53	12	5	11	66	2	1	173
Total		777	701	1,272	1,150	286	259	484	281	5,210

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Urology – Regional Relative Utilization Rates

Region	Actual Cases	Expected Cases	Utilization Rate
1	1,276	1,270	1.00
2	1,143	1,197	0.95
3	1,182	1,067	1.11
4	314	353	0.89
5	270	225	1.20
6	536	588	0.91
7	304	325	0.93

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Urology – Distribution of Specialists Among Hospitals

Hospital	Number of Specialists	Specialists with >100 RIW	Avg. RIW for Specialists with > 100 RIW	Total RIWs for all Specialists
NB	19	17	294	5034
Saint John Regional Hospital	5	4	291	1194
Dr. Everett Chalmers Regional Hospital	3	3	313	940
The Moncton Hospital	6	4	222	899
Dr. Georges L. Dumont Hospital	3	2	325	654
Bathurst Regional Hospital	2	2	218	436
Edmundston Regional Hospital	1	1	275	275
Miramichi Regional Hospital	1	1	242	242
Campbellton Regional Hospital	1	1	209	209
The Oromocto Hospital	3	0	—	130
Sussex Health Centre	1	0	—	20
The Carleton Memorial Hospital (Woodstock)	1	0	—	16
Charlotte County Hospital (St. Stephen)	1	0	—	16
Grand Falls General Hospital	1	0	—	4

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Urology – Case Distribution of Program Among Specialists and Other Physicians

Hospital	Number of Physicians with RIWs for Program	Number of Physicians with >50 RIWs for Program	Number of Specialists with >50 RIWs for Program	Average RIWs for all Physicians	Average RIWs for Specialists	RIWs for Program
NB	288	17	17	235	235	5196
Saint John Regional Hospital	41	4	4	244	244	1139
Dr. Everett Chalmers Regional Hospital	36	3	3	250	250	871
Dr. Georges L. Dumont Hospital	38	2	2	279	279	740
The Moncton Hospital	26	4	4	151	151	682
Bathurst Regional Hospital	11	2	2	186	186	401
Miramichi Regional Hospital	22	1	1	164	164	275
Edmundston Regional Hospital	9	1	1	230	230	249
Camphill Regional Hospital	13	1	1	174	174	211
The Quinmoran Hospital	11	0	0	–	–	136

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Urology – Scenario: All Regional Hospitals

Patient Came from Region	Dr. Georges Dumont Hospital	The Moncton Regional Hospital	Saint John Regional Hospital	Dr. Everett Chalmers Hospital	Hopital Regional D. Edmundston	Camphill Regional Hospital	Bathurst Regional Hospital	The Miramichi Regional Hospital	Elsewhere	Total RIW	Avg. Distance Travelled (km)
1 Actual RIW	598	603	23	1			1	2	41	1,270	14
Scenario RIW	600	609	23	1			1	2	38	1,270	14
2 Actual RIW	1	8	96	20					124	1,142	30
Scenario RIW	1	12	102	40					63	1,142	31
3 Actual RIW	0	1	103	812	7			2	231	1,178	44
Scenario RIW	8	1	105	928	21			2	117	1,178	45
4 Actual RIW	9		5	0	230	10			40	303	39
Scenario RIW	9		5	0	230	10			30	303	41
5 Actual RIW	26	7	14	1	1	130	38	3	44	265	68
Scenario RIW	26	7	15	1	1	130	38	3	44	265	68
6 Actual RIW	66	5	10	1		4	352	12	80	531	75
Scenario RIW	66	5	10	1		6	362	12	70	531	76
7 Actual RIW	17	3	4	4			9	254	7	302	44
Scenario RIW	17	3	4	6			9	256	5	302	45
Total Actual RIW	740	682	1,138	875	240	211	401	275	396	5,163	56
Total Scenario RIW	748	687	1,197	986	273	211	411	277	372	5,163	57
Family Practice RIW	37	30	32	80	12	16	21	190	342	730	
PTE Actual	2.7	2.4	4.2	5.0	0.9	0.7	1.0	0.7	1.9	17.1	
PTE Scenario	2.7	2.4	4.9	5.0	1.0	0.7	1.0	0.7	0.7	17.1	

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Urology – Scenario: Base Hospitals plus Edmundston and Bathurst

Patient Came from Region		Dr. Georges Dumont	The Moncton Hospital	Saint John Regional Hospital	Dr. Everett Chalmers Hospital	Hopital Regional D. Edmundston	Bathurst Regional Hospital	Elsewhere	Total RIW	Avg. Distance Travelled (km)
1	Actual RIW	598	603	23	1		1	44	1,270	16
	Scenario RIW	602	604	23	1		1	39	1,270	16
2	Actual RIW	1	8	966	39			127	1,142	30
	Scenario RIW	3	12	1,023	40			64	1,142	23
3	Actual RIW	0	1	103	812	7		233	1,178	44
	Scenario RIW	4	1	103	828	21		118	1,178	43
4	Actual RIW	9		3	9	236		49	303	39
	Scenario RIW	9		3	0	247		50	303	41
5	Actual RIW	26	7	16	1	1	38	177	263	68
	Scenario RIW	26	7	16	1	1	147	67	263	105
6	Actual RIW	66	3	10	1		352	98	531	75
	Scenario RIW	66	3	10	1		377	73	531	77
7	Actual RIW	17	5	4	6		9	263	302	44
	Scenario RIW	24	5	4	11		153	105	362	77
Total	Actual RIW	740	682	1,130	873	240	401	1,082	5,163	36
	Scenario RIW	757	741	1,197	964	283	680	512	5,163	40
Family Practice RIW		37	50	52	80	12	21	477	730	
FTE Actual		2.6	2.3	4.0	2.9	0.9	1.4	2.2	16.1	
FTE Scenario		2.6	2.5	4.2	3.3	1.0	2.4	0.1	16.1	

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Plastic Surgery – Program Description

CMG	CMG Description	Dimension of Distribution	Total RIW	RIWs for Specialists
428	BREAST PROCEDURES EXCEPT BIOPSY AND LOCAL EXCISION	Regional	328	301
664	WOUND DEBRIDEMENT AND SKIN GRAFT FOR TRAUMA	Regional	305	114
006	CARPAL TUNNEL RELEASE AND SPECIFIED NERVOUS SYSTEM	Regional	280	176
427	SKIN GRAFT AND WOUND DEBRIDEMENT FOR SKIN ULCER OR	Regional	226	110
425	SKIN GRAFT AND WOUND DEBRIDEMENT FOR DERMATOLOGIC D	Regional	140	103
832	NON-EXTENSIVE BURNS WITH SKIN GRAFT	Regional	139	127
377	WOUND DEBRIDEMENT AND SKIN GRAFT FOR MUSCULOSKELETA	Regional	135	33
668	MISCELLANEOUS MUSCULOSKELETAL PROCEDURES FOR TRAUMA	Regional	109	68
436	PLASTIC SURGERY	Regional	79	72
834	NON-EXTENSIVE BURNS WITHOUT BURN PROCEDURES	Regional	73	42
694	FACIAL INJURIES	Regional	66	21
478	OBESITY PROCEDURES	Regional	59	30
381	HAND AND WRIST PROCEDURES (MNRH)	Decentralized	190	138
437	OTHER DERMATOLOGICAL PROCEDURES WITHOUT MALIGNANCY	Decentralized	169	54
692	WOUNDS	Decentralized	115	38

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Plastic Surgery – Patient Flow (RIW)

Patient came from	Region	Treated at								Total
		RHC1B	RHC1SE	RHC2	RHC3	RHC4	RHC5	RHC6	RHC7	
1		231	305	17	4			2	1	560
2		5	6	475	28			1		514
3			3	23	639	2			1	668
4		1	1	1	25	156	2	27	1	185
5		3	6	1	1	3	65	44	1	124
6		13	16	8			6	258	5	307
7		14	71	3	22			29	89	228
Other Provinces		15	50	7	10	7	21	6	5	122
Total		282	458	514	728	139	94	367	105	2,706

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Plastic Surgery – Regional Relative Utilization Rates

Region	Actual Cases	Expected Cases	Utilization Rate
1	562	645	0.87
2	513	615	0.83
3	668	561	1.19
4	196	189	1.04
5	121	113	1.07
6	307	310	0.99
7	231	166	1.39

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Plastic Surgery – Distribution of Specialists Among Hospitals

Hospital	Number of Specialists	Specialists with >100 RIW	Avg. RIW for Specialists with > 100 RIW	Total RIWs for all Specialists
NB	16	11	199	2410
Dr. Everett Chalmers Regional Hospital	4	3	175	609
Saint John's Regional Hospital	3	3	198	593
The Moncton Hospital	5	3	127	479
Bathurst Regional Hospital	3	2	145	292
Dr. Georges L. Dumont Hospital	6	1	111	284
Centre Hospitalier de Caraquet	2	0	—	78
The Chénost Hospital	4	0	—	64
Centre Hospitalier de Tracadie	3	0	—	7
Sackville Memorial Hospital	3	0	—	2
Sussex Health Centre	0	0	—	1
Charlotte County Hospital St. Stephen	0	0	—	1

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Plastic Surgery – Case Distribution of Program Among Specialists and Other Physicians

Hospital	Number of Physicians with RIWs for Program	Number of Physicians with >50 RIWs for Program	Number of Specialists with >50 RIWs for Program	Average RIWs for all Physicians	Average RIWs for Specialists	RIWs for Program
NB	197	12	12	136	136	2721
Dr. Everett Chalmers Regional Hospital	53	4	4	119	119	613
Saint John's Regional Hospital	29	1	1	126	126	487
The Moncton Hospital	25	1	1	92	92	450
Dr. Georges L. Dumont Hospital	26	2	2	70	70	283
Bathurst Regional Hospital	16	2	2	98	98	271
Edmundston Regional Hospital	10	0	0	—	—	128
Moncton Regional Hospital	19	0	0	—	—	105

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Plastic Surgery – Scenario: Base Hospitals plus Bathurst

Patient Came from Region		Dr. Georges Dumont	The Moncton Hospital	Saint John Regional Hospital	Dr. Everett Chalmers Hospital	Bathurst Regional Hospital	Elsewhere	Total RIW	Avg. Distance Travelled (km)
1	Actual RIW	232	299	14	3	0	13	561	19
	Scenario RIW	238	299	14	3	1	0	561	17
2	Actual RIW	3	6	432	23	1	44	511	28
	Scenario RIW	5	8	454	26	1	18	511	31
3	Actual RIW	0	3	22	536	0	103	664	42
	Scenario RIW	3	3	25	609	0	25	664	47
4	Actual RIW	1	1	1	19	20	141	183	72
	Scenario RIW	1	1	1	33	115	30	183	108
5	Actual RIW	3	6	1	1	35	74	120	61
	Scenario RIW	3	6	1	1	81	26	120	94
6	Actual RIW	13	16	8	0	183	82	305	62
	Scenario RIW	13	16	8	0	255	13	305	94
7	Actual RIW	14	72	3	20	23	96	229	75
	Scenario RIW	18	72	3	26	78	32	229	97
Total	Actual RIW	283	450	487	613	271	592	2,696	40
	Scenario RIW	296	478	512	709	339	163	2,696	51
Family Practice RIW		11	14	18	31	2	109	205	
FTE	Actual	1.7	2.7	2.9	3.3	1.7	3.9	15.5	
FTE	Scenario	1.8	2.9	3.1	4.1	3.3	0.3	15.5	

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Vascular Surgery – Program Description

CMG	CMG Description	Dimension of Distribution	Total RIW	RIWs for Specialists
885	AORTIC REPLACEMENT	Regional	761	639
887	VASCULAR BYPASS SURGERY	Regional	703	545
881	AMPUTATION OF LOWER LIMB EXCEPT TOE	Regional	373	64
804	NON-EXTENSIVE PROCEDURES FOR INJURY OR COMPLICATION	Regional	341	52
004	EXTRACRANIAL VASCULAR PROCEDURES	Regional	308	197
891	VASCULAR REPAIR	Regional	189	141
880	AMPUTATION OF LOWER LIMB EXCEPT TOE WITH MAJOR VASC	Regional	176	76
892	OTHER VASCULAR PROCEDURES	Regional	117	74
882	WOUND DEBRIDEMENT OR OTHER AMPUTATION WITH MAJOR VA	Regional	76	30
893	VEIN LIGATION AND STRIPPING (MVRH)	Regional	69	36
898	PERIPHERAL VASCULAR DISEASE	Decentralized	499	147
910	DIAGNOSIS NOT GENERALLY HOSPITALIZED	Decentralized	127	22

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Vascular Surgery – Patient Flow (RIW)

Patient came from	Region	Treated at							Total
		RHC1B	RHC1SE	RHC2	RHC3	RHC4	RHC5	RHC6	
1		284	622	4				1	910
2		4	14	758	85				861
3		1	6	44	645	1			697
4		2	1	2	10	167	2		184
5		54	103	2		4	40	4	207
6		188	72	2				73	336
7		33	178	20	14			4	293
Other Provinces		19	101	8	6	192	16	2	342
Total		586	1,097	839	760	364	57	83	3,850

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Vascular Surgery – Regional Relative Utilization Rates

Region	Actual Cases	Expected Cases	Utilization Rate
1	918	907	1.01
2	871	858	1.02
3	703	743	0.95
4	197	247	0.80
5	208	161	1.29
6	351	403	0.87
7	298	228	1.30

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Vascular Surgery – Distribution of Specialists Among Hospitals

Hospital	Number of Specialists	Specialists with >100 RIW	Avg. RIW for Specialists with > 100 RIW	Total RIWs for all Specialists
NB	9	7	561	4002
The Moncton Hospital	3	2	711	1433
Dr. Everett Chalmers Regional Hospital	2	1	923	988
Saint John Regional Hospital	2	2	444	888
Dr. Georges L. Dumont Hospital	1	1	424	424
Edmundston Regional Hospital	1	1	247	247
The Oromocto Hospital	1	0	-	22

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Vascular Surgery – Case Distribution of Program Among Specialists and Other Physicians

Hospital	Number of Physicians with RIWs for Program	Number of Physicians with >50 RIWs for Program	Number of Specialists with >50 RIWs for Program	Average RIWs for all Physicians	Average RIWs for Specialists	RIWs for Program
NB	203	11	7	223	292	1891
The Moncton Hospital	37	2	2	434	434	1098
Saint John Regional Hospital	47	3	2	129	137	626
Dr. Everett Chalmers Regional Hospital	34	2	1	274	421	874
Dr. Georges L. Dumont Hospital	22	2	1	213	189	390
Edmundston Regional Hospital	11	2	1	163	241	368

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Vascular Surgery – Scenario: Base Hospitals plus Edmundston

Patient Came from Region		Dr. Georges Dumont	The Moncton Hospital	Saint John Regional Hospital	Dr. Everett Chalmers Hospital	Hospital Regional D. Edmundston	Elsewhere	Total RIW	Avg. Distance Travelled (km)
1	Actual RIW	284	619	4			5	912	17
	Scenario RIW	285	619	4			4	912	17
2	Actual RIW	4	14	742	83		23	866	30
	Scenario RIW	5	14	744	84		19	866	30
3	Actual RIW	1	6	46	565	1	83	702	49
	Scenario RIW	3	6	46	591	8	48	702	32
4	Actual RIW	2	1	2	5	160	11	190	36
	Scenario RIW	2	1	2	5	172	7	190	35
5	Actual RIW	54	103	2			4	207	196
	Scenario RIW	54	104	2		24	25	207	224
6	Actual RIW	192	72	2			74	341	134
	Scenario RIW	193	92	2			54	341	177
7	Actual RIW	34	181	20	14		48	298	112
	Scenario RIW	48	186	20	14		29	298	124
Total	Actual RIW	590	1,098	826	674	368	204	3,861	58
	Scenario RIW	608	1,124	828	701	401	199	3,861	63
Family Practice RIW		32	83	82	43	7	175	422	
FTE	Actual	1.9	3.5	2.6	2.2	1.2	0.4	11.8	
FTE	Scenario	2.0	3.6	2.6	2.3	1.4	0.1	11.8	

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Vascular Surgery – Scenario: Base Hospitals plus Edmundston (Regional and Centralized Cases only)

Patient Came from Region		Dr. Georges Dumont	The Moncton Hospital	Saint John Regional Hospital	Dr. Everett Chalmers Hospital	Hospital Regional D. Edmundston	Elsewhere	Total RIW	Avg. Distance Travelled (km)
1	Actual RIW	230	552	2			1	786	16
	Scenario RIW	231	552	2			0	786	16
2	Actual RIW	4	9	624	69		4	711	32
	Scenario RIW	4	9	626	70		1	711	31
3	Actual RIW	0	6	35	485	1	42	570	51
	Scenario RIW	2	6	35	511	8	8	570	55
4	Actual RIW	2	1	2	5	158	4	171	56
	Scenario RIW	2	1	2	5	161	0	171	55
5	Actual RIW	44	96				22	167	218
	Scenario RIW	44	97			24	1	167	264
6	Actual RIW	171	62	1			33	268	179
	Scenario RIW	172	82	1			13	268	223
7	Actual RIW	26	162	17	14		28	247	118
	Scenario RIW	40	167	17	14		9	247	139
Total	Actual RIW	494	979	688	579	355	147	3,244	64
	Scenario RIW	513	1,005	690	606	388	43	3,244	72
Family Practice RIW		13	71	65	18	1	42	211	
FTE	Actual	1.8	3.4	2.3	2.1	1.3	0.4	11.3	
FTE	Scenario	1.9	3.5	2.3	2.2	1.4	0.0	11.3	

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**Vascular Surgery –
Scenario: Regions 1SE, 2, and 3
(Regional and Centralized Cases only)**

Patient Came from Region		The Moncton Hospital	Saint John Regional Hospital	Dr. Everett Chalmers Hospital	Elsewhere	Total RIW	Avg Distance Travelled (km)
1	Actual RIW	552	2	0	231	786	16
	Scenario RIW	768	2	3	12	786	16
2	Actual RIW	9	624	69	8	711	32
	Scenario RIW	14	626	70	1	711	31
3	Actual RIW	6	35	485	44	570	51
	Scenario RIW	8	35	519	8	570	58
4	Actual RIW	1	2	5	163	171	56
	Scenario RIW	2	2	167	1	171	243
5	Actual RIW	96			70	167	218
	Scenario RIW	164			2	167	292
6	Actual RIW	62	1		204	268	179
	Scenario RIW	254	1		13	268	223
7	Actual RIW	162	17	14	55	247	118
	Scenario RIW	207	17	14	9	247	139
Total	Actual RIW	979	688	579	997	3,244	64
	Scenario RIW	1,719	690	778	56	3,244	90
Family Practice RIW		71	65	18	56	211	
FTE Actual		3.1	2.1	1.9	3.2	10.3	
FTE Scenario		5.6	2.1	2.6	0.0	10.3	

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**Vascular Surgery –
Scenario: Regions 1SE and 2
(Regional and Centralized Cases only)**

Patient Came from Region		The Moncton Hospital	Saint John Regional Hospital	Elsewhere	Total RIW	Avg Distance Travelled (km)
1	Actual RIW	552	2	231	786	16
	Scenario RIW	772	2	12	786	16
2	Actual RIW	9	624	77	711	32
	Scenario RIW	17	693	1	711	26
3	Actual RIW	4	35	529	570	51
	Scenario RIW	66	479	26	570	135
4	Actual RIW	1	2	168	171	56
	Scenario RIW	16	154	1	171	333
5	Actual RIW	96	0	70	167	218
	Scenario RIW	164	0	2	167	291
6	Actual RIW	62	1	204	268	179
	Scenario RIW	254	1	13	268	223
7	Actual RIW	162	17	68	247	118
	Scenario RIW	221	17	9	247	137
Total	Actual RIW	979	688	1,576	3,244	64
	Scenario RIW	1,818	1,352	74	3,244	114
Family Practice RIW		71	65	74	211	
FTE Actual		3.4	2.3	5.6	11.3	
FTE Scenario		6.3	4.8	0.0	11.3	

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Vascular Surgery – Scenario: Regions 1SE and 3 (Regional and Centralized Cases)

Patient Came from Region		The Moncton Hospital	Dr. Everett Chalmers Hospital	Elsewhere	Total RIW	Avg Distance Travelled (km)
1	Actual RIW	532	0	234	786	16
	Scenario RIW	772	3	12	786	15
2	Actual RIW	9	69	632	711	32
	Scenario RIW	48	601	62	711	100
3	Actual RIW	6	485	79	570	51
	Scenario RIW	8	554	8	570	54
4	Actual RIW	1	5	166	171	56
	Scenario RIW	2	169	1	171	241
5	Actual RIW	96		70	167	218
	Scenario RIW	164		2	167	292
6	Actual RIW	62		205	268	179
	Scenario RIW	255		13	268	222
7	Actual RIW	162	14	71	247	118
	Scenario RIW	222	16	9	247	133
Total	Actual RIW	979	579	1,685	3,244	64
	Scenario RIW	1,775	1,348	121	3,244	103
Family Practice RIW		71	18	121	211	
FTE	Actual	2.3	1.4	4.0	7.8	
FTE	Scenario	4.4	3.4	2.0	7.8	

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Otolaryngology – Program Description

CMG	CMG Description	Degree of Distribution	Total RIW	RIWs for Specialists
093	TONSILLECTOMY AND ADENOIDECTOMY PROCEDURES (MNRH)	Regional	713	646
092	MYRINGOTOMY (MNRH)	Regional	245	242
091	NASAL PROCEDURES (MNRH)	Regional	221	202
115	MISCELLANEOUS ENT DIAGNOSES (MNRH)	Regional	213	71
479	THYROID PROCEDURES	Regional	179	109
090	EXTERNAL AND MIDDLE EAR PROCEDURES (MNRH)	Regional	161	150
076	MAJOR HEAD AND NECK PROCEDURES	Regional	155	121
077	LESS EXTENSIVE HEAD AND NECK PROCEDURES	Regional	143	130
085	MASTOID PROCEDURES	Regional	103	97
084	MISCELLANEOUS EAR, NOSE AND THROAT PROCEDURES	Regional	85	60
100	ENT MALIGNANCY	Regional	81	11
088	ETHMOIDECTOMY (MNRH)	Regional	60	60
081	SALIVARY GLAND PROCEDURES	Regional	60	60
087	SINUS PROCEDURES	Regional	53	46
106	EPISTAXIS	Decentralized	61	41

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Otolaryngology – Patient Flow (RIW)

Patient came from	Region	Treated at								Total
		RHC1B	RHC1SE	RHC2	RHC3	RHC4	RHC5	RHC6	RHC7	
1		295	282	4	2			2	2	586
2		1	2	649	37					688
3		1	2	40	456	2		1		502
4		3	2		9	169	1	6		190
5		18	6			1	26	25		75
6		52	2	1	3			359	1	418
7		30	16	1	27			22	66	161
Other Provinces		12	17	2		6	6	2		46
Total		412	327	698	553	178	34	417	69	2,668

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Otolaryngology - Regional Relative Utilization Rates

Region	Actual Cases	Expected Cases	Utilization Rate
1	590	645	0.91
2	688	646	1.06
3	500	586	0.85
4	218	191	1.14
5	77	114	0.68
6	422	308	1.37
7	163	168	0.97

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Otolaryngology – Distribution of Specialists Among Hospitals

Hospital	Number of Specialists	Specialists with >100 RIW	Avg. RIW for Specialists with > 100 RIW	Total RIWs for all Specialists
NB	15	13	243	3262
The Moncton Hospital	4	4	223	892
Saint John Regional Hospital	3	3	229	687
Dr. Georges L. Dumont Hospital	1	1	152	455
Bellevue Regional Hospital	1	1	144	432
Dr. Everett Chalmers Regional Hospital	3	2	167	391
Edmundston Regional Hospital	1	1	196	196
The Oromocto Hospital	3	0	—	126
Manicouche Regional Hospital	4	0	—	52
Campbellton Regional Hospital	1	0	—	18
Sussex Health Centre	1	0	—	8
Charlotte County Hospital (St. Stephen)	1	0	—	3
Grand Falls General Hospital	1	0	—	2

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Otolaryngology – Distribution of Program Among Specialists and Other Physicians

Hospital	Number of Physicians with RIWs for Program	Number of Physicians with >50 RIWs for Program	Number of Specialists with >50 RIWs for Program	Average RIWs for all Physicians	Average RIWs for Specialists	RIWs for Program
NB	146	14	14	113	153	2703
Saint John Regional Hospital	23	3	3	198	198	873
Dr. Georges L. Dumont Hospital	24	3	3	111	111	404
Dr. Everett Chalmers Regional Hospital	20	2	2	131	131	365
Bellevue Regional Hospital	14	3	3	118	118	346
The Moncton Hospital	12	3	3	83	83	327
Edmundston Regional Hospital	12	1	1	121	121	153
The Oromocto Hospital	4	1	1	53	53	124

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Otolaryngology – Scenario: Base Hospitals plus Bathurst

Patient Came from Region		Dr. Georges Dumont	The Moncton Hospital	Saint John Regional Hospital	Dr. Everett Chalmers Hospital	Bathurst Regional Hospital	Elsewhere	Total RIW	Avg. Distance Travelled (km)
1	Actual RIW	291	282	4	1	2	4	583	10
	Scenario RIW	293	282	4	1	2	1	583	10
2	Actual RIW	1	2	627	28	0	29	687	27
	Scenario RIW	1	4	645	28	0	8	687	28
3	Actual RIW	1	2	37	311	1	146	498	30
	Scenario RIW	4	2	40	433	1	19	498	30
4	Actual RIW	3	1	0	3	6	176	191	42
	Scenario RIW	3	1	1	36	121	28	191	199
5	Actual RIW	13	6	0	0	24	27	73	73
	Scenario RIW	13	6	0	0	44	8	73	105
6	Actual RIW	52	2	1	3	299	63	419	33
	Scenario RIW	52	2	1	3	350	31	419	37
7	Actual RIW	30	16	1	22	21	71	161	79
	Scenario RIW	32	16	1	26	69	16	161	100
Total	Actual RIW	404	327	673	369	356	528	2,657	38
	Scenario RIW	413	337	693	528	370	116	2,657	52
Family Practice RIW		31	4	17	24	11	113	200	
FTE Actual		1.9	1.7	3.4	1.8	1.8	2.1	12.7	
FTE Scenario		2	1.7	3.5	2.6	2.9	0	12.7	

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Haematology – Program Description

CMG	CMG Description	Dimension of Distribution	Total RIW	RIWs for Specialists
726	ACUTE LEUKEMIA WITHOUT MAJOR PROCEDURES	Centralized	310	212
734	ILL-DEFINED NEOPLASM WITH OTHER PROCEDURES	Centralized	128	29
736	CHEMOTHERAPY	Regional	817	358
750	LYMPHOMA AND CHRONIC LEUKEMIA	Regional	755	313
728	LYMPHOMA AND CHRONIC LEUKEMIA WITH OTHER PROCEDURES	Regional	264	35
725	MAJOR LEUKEMIA AND LYMPHOMA PROCEDURES	Regional	239	38
443	MALIGNANT BREAST DISORDERS	Regional	158	25
392	MALIGNANCY OF FEMALE REPRODUCTIVE ORGAN	Regional	120	18
737	OTHER POORLY DIFFERENTIATED NEOPLASTIC DIAGNOSES	Regional	123	4
710	RETICULOENDOTHELIAL AND IMMUNITY DISORDERS	Decentralized	259	30
709	COAGULATION DISORDERS	Decentralized	115	17

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Haematology – Patient Flow (RIW)

Patient came from	Region	Treated at							Total
		RHC1B	RHC1SE	RHC2	RHC3	RHC4	RHC5	RHC6	
1		563	538						901
2		1	14	555			4		570
3		1	10	205	353	3	4		575
4		12	8	10	4	130	1		175
5		57	41	2			108	1	209
6		175	108	3	3		1	195	490
7		81	114	10				10	286
Other Provinces		26	64	2	1	1	17	2	113
Total		716	897	788	361	143	130	208	3,319

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Haematology – Regional Relative Utilization Rates

Region	Actual Cases	Expected Cases	Utilization Rate
1	901	811	1.11
2	562	773	0.73
3	581	682	0.85
4	184	227	0.81
5	210	146	1.43
6	493	368	1.34
7	284	206	1.38

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Haematology – Distribution of Specialists Among Hospitals

Hospital	Number of Specialists	Specialists with >100 RIW	Avg. RIW for Specialists with > 100 RIW	Total RIWs for all Specialists
NB	5	3	583	1822
The Moncton Hospital	1	1	1132	1132
Saint John Regional Hospital	1	1	362	362
Dr. Georges L. Dumont Hospital	3	1	253	327
Albert County Hospital	0	0	—	1

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Haematology – Case Distribution of Program Among Specialists and Other Physicians

Hospital	Number of Physicians with RIWs for Program	Number of Physicians with >50 RIWs for Program	Number of Specialists with >50 RIWs for Program	Average RIWs for all Physicians	Average RIWs for Specialists	RIWs for Program
NB	340	8	3	188	343	1321
The Moncton Hospital	90	1	1	156	936	880
Saint John Regional Hospital	90	1	1	149	242	732
Dr. Georges L. Dumont Hospital	44	4	1	100	136	691
Dr. Everett Chisholm Regional Hospital	32	0	0	—	—	233
Edmundston Regional Hospital	18	0	0	—	—	118

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Haematology – Scenario: Regions 1B, 1SE, and 2

Patient Came from Region		Dr. Georges Dumont	The Moncton Hospital	Saint John Regional Hospital	Elsewhere	Total RIW	Avg Distance Travelled (km)
1	Actual RIW	339	527		30	895	14
	Scenario RIW	339	527		30	895	14
2	Actual RIW	1	14	494	52	561	31
	Scenario RIW	1	15	504	41	561	30
3	Actual RIW	1	10	210	359	580	64
	Scenario RIW	8	21	301	250	580	97
4	Actual RIW	12	8	13	140	170	70
	Scenario RIW	12	8	01	59	170	255
5	Actual RIW	58	41	2	109	210	153
	Scenario RIW	58	42	2	108	210	156
6	Actual RIW	176	106	3	204	489	146
	Scenario RIW	178	146	3	163	489	162
7	Actual RIW	79	113	10	87	282	102
	Scenario RIW	85	115	10	73	282	107
Total	Actual RIW	691	880	732	996	3,299	68
	Scenario RIW	706	937	914	743	3,299	87
Family Practice RIW		308	113	122	712	1,255	
FTE	Actual	1.1	2.2	1.8	0.8	5.9	
FTE	Scenario	1.2	2.4	2.3	0.1	5.9	

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Haematology – Scenario: Regions 1SE and 2

Patient Came from Region		The Moncton Hospital	Saint John Regional Hospital	Elsewhere	Total RIW	Avg Distance Travelled (km)
1	Actual RIW	527		369	895	14
	Scenario RIW	678		217	895	14
2	Actual RIW	14	494	53	561	31
	Scenario RIW	15	505	41	561	36
3	Actual RIW	10	210	360	580	64
	Scenario RIW	29	303	251	580	97
4	Actual RIW	8	11	152	170	70
	Scenario RIW	9	100	62	170	254
5	Actual RIW	41	2	167	210	153
	Scenario RIW	80	2	127	210	156
6	Actual RIW	106	3	380	489	146
	Scenario RIW	255	3	230	489	202
7	Actual RIW	113	10	159	282	102
	Scenario RIW	156	10	117	282	107
Total	Actual RIW	880	732	1,687	3,299	68
	Scenario RIW	1,300	922	1,076	3,299	87
Family Practice RIW		113	122	1,020	1,255	
FTE	Actual	1.7	1.4	1.5	4.6	
FTE	Scenario	2.6	1.8	0.1	4.6	

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Haematology – Scenario: Region 1SE only

Patient Came from Region		The Moncton Hospital	Elsewhere	Total RIW	Avg. Distance Travelled (km)
1	Actual RIW	527	309	895	14
	Scenario RIW	678	217	895	14
2	Actual RIW	14	547	561	31
	Scenario RIW	352	209	561	115
3	Actual RIW	10	370	380	64
	Scenario RIW	376	234	380	126
4	Actual RIW	8	162	170	70
	Scenario RIW	108	63	170	268
5	Actual RIW	41	169	210	153
	Scenario RIW	83	127	210	153
6	Actual RIW	106	343	489	146
	Scenario RIW	259	230	489	161
7	Actual RIW	113	169	282	102
	Scenario RIW	166	117	282	106
Total	Actual RIW	880	2,419	3,299	68
	Scenario RIW	2,051	1,248	3,299	105
Family Practice RIW		113	1,142	1,255	
FTE Actual		1.2	1.9	3.1	
FTE Scenario		3.0	0.2	3.1	

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Thoracic Surgery – Program Description

CMG	CMG Description	Dimension of Distribution	Total RIW	RIWs for Specialists
125	TRACHEOSTOMY	Regional	946	45
127	MAJOR RESPIRATORY PROCEDURES	Regional	469	106
126	RESECTION OF LUNG	Regional	447	208
250	EXTENSIVE GASTROINTESTINAL PROCEDURES	Regional	151	36
129	OTHER RESPIRATORY PROCEDURES	Regional	142	42

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Thoracic Surgery – Patient Flow (RIW)

Patient came from	Region	Treated at								Total
		RHC1B	RHC1SE	RHC2	RHC3	RHC4	RHC5	RHC6	RHC7	
1		248	195	26						469
2			3	586	5					594
3				13	424	3				440
4		3	4		1	154				162
5		25	90				38	7		161
6		57	8	7				112		184
7		17	53	11	8			7	10	107
Other Provinces		8	62	18		1	5			95
Total		359	416	661	438	159	43	126	10	2,211

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Thoracic Surgery – Regional Relative Utilization Rates

Region	Actual Cases	Expected Cases	Utilization Rate
1	464	529	0.88
2	576	499	1.15
3	433	440	0.98
4	163	148	1.09
5	152	97	1.57
6	193	238	0.81
7	106	134	0.79

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Thoracic Surgery – Distribution of Specialists Among Hospitals

Hospital	Number of Specialists	Specialists with >100 RIW	Avg. RIW for Specialists with > 100 RIW	Total RIWs for all Specialists
NH	3	3	521	1563
Dr. Everett Chalmers Regional Hospital	1	1	695	695
The Mountain Hospital	1	1	585	585
Edmondston Regional Hospital	1	1	282	282
The Ochsner Hospital	1	0	—	1

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Thoracic Surgery – Case Distribution of Program Among Specialists and Other Physicians

Hospital	Number of Physicians with RIWs for Program	Number of Physicians with >50 RIWs for Program	Number of Specialists with >50 RIWs for Program	Average RIWs for all Physicians	Average RIWs for Specialists	RIWs for Program
NH	105	14	2	75	224	2180
St. John Regional Hospital	30	4	0	95	—	940
The Mountain Hospital	14	3	1	115	229	406
Dr. Everett Chalmers Regional Hospital	14	3	1	118	219	403
Dr. Georges L. Dumas Hospital	15	4	0	90	—	353
Edmondston Regional Hospital	8	0	0	—	—	187
Baltimore Regional Hospital	10	0	0	—	—	121

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Thoracic Surgery – Scenario: Base Hospitals (Restricted to Exclusive Thoracic Cases*)

Patient Came from Region		Dr. Georges Dumont	The Moncton Hospital	Saint John Regional Hospital	Dr. Everett Chalmers Hospital	Elsewhere	Total RIW	Avg. Distance Travelled (km)
1	Actual RIW	112	125	1			238	16
	Scenario RIW	112	125	1			238	16
2	Actual RIW		3	240	5	2	250	28
	Scenario RIW		3	240	5	2	250	28
3	Actual RIW			13	203	13	229	51
	Scenario RIW			13	216	0	229	55
4	Actual RIW	3	4		1	42	50	75
	Scenario RIW	3	4		30	3	50	227
5	Actual RIW	24	29			14	67	234
	Scenario RIW	24	35			7	67	263
6	Actual RIW	11	8	6		75	100	80
	Scenario RIW	11	96	6		17	100	206
7	Actual RIW	17	52	11	8	17	106	127
	Scenario RIW	18	59	11	8	9	106	129
Total	Actual RIW	176	236	270	217	175	1,074	56
	Scenario RIW	178	309	270	268	50	1,074	76
Family Practice RIW		32	10	51	32	50	174	
FTE	Actual	0.8	1.2	1.2	1.0	0.7	4.9	
FTE	Scenario	0.8	1.6	1.2	1.3	0.9	4.9	

* Resection of Lung, Major Respiratory Procedures ...

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Nephrology – Program Description

CMG	CMG Description	Dimension of Distribution	Total RIW	RIWs for Specialists
503	DIALYSIS PROCEDURES	Centralized	411	291
520	RENAL FAILURE WITH DIALYSIS	Centralized	240	157
525	NEPHROPATHY WITHOUT NEPHROTIC SYNDROME	Centralized	107	62
507	VASCULAR AND OTHER URINARY PROCEDURES	Regional	80	36
521	RENAL FAILURE WITHOUT DIALYSIS	Decentralized	409	60
818	COMPLICATIONS OF TREATMENT	Decentralized	395	55
015	NONSPECIFIC CEREBROVASCULAR DISORDERS	Decentralized	104	12

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Nephrology – Patient Flow (RIW)

Patient came from	Region	Treated at								Total
		RHC1B	RHC1SE	RHC2	RHC3	RHC4	RHC5	RHC6	RHC7	
1		313	108	12					1	433
2		7	2	353	6					348
3		3		103	212	8	1			327
4		1			4	97	1	1		104
5		49	1		1		57	9	1	118
6		129	8	5				99	2	242
7		74	13		1			7	52	146
Other Provinces		101	22	2	4	2	13	3		147
Total		677	153	456	227	107	72	118	56	1,866

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Nephrology – Regional Relative Utilization Rates

Region	Actual Cases	Expected Cases	Utilization Rate
1	436	437	1.00
2	342	415	0.82
3	323	360	0.90
4	100	120	0.84
5	118	78	1.51
6	247	193	1.28
7	147	110	1.34

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Nephrology – Distribution of Specialists Among Hospitals

Hospital	Number of Specialists	Specialists with >100 RIW	Avg. RIW for Specialists with > 100 RIW	Total RIWs for all Specialists
NB	7	6	260	1593
Dr. Georges L. Dumont Hospital	4	3	403	1250
Saint John Regional Hospital	3	3	114	342
The Moncton Hospital	0	0	—	1

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Nephrology – Case Distribution of Program Among Specialists and Other Physicians

Hospital	Number of Physicians with RIWs for Program	Number of Physicians with >50 RIWs for Program	Number of Specialists with >50 RIWs for Program	Average RIWs for all Physicians	Average RIWs for Specialists	RIWs for Program
NB	287	5	4	114	174	504
Dr. Georges L. Dumont Hospital	12	1	1	146	146	438
Saint John Regional Hospital	53	0	0	62	62	356
The Moncton Hospital	58	0	0	—	—	141
Dr. Everett Clincham Regional Hospital	30	0	0	—	—	137

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Nephrology – Scenario: Regions 1B and 2

Patient Came from Region		Dr. Georges Dumont	Saint John Regional Hospital	Elsewhere	Total RIW	Avg. Distance Travelled (km)
1	Actual RIW	307	11	112	430	21
	Scenario RIW	332	11	97	430	21
2	Actual RIW	7	277	56	339	30
	Scenario RIW	7	277	53	339	30
3	Actual RIW	3	101	219	323	58
	Scenario RIW	11	110	202	323	64
4	Actual RIW	1	0	92	94	47
	Scenario RIW	2	59	33	94	125
5	Actual RIW	40		68	118	113
	Scenario RIW	56		61	118	132
6	Actual RIW	128	5	108	241	106
	Scenario RIW	148	5	88	241	119
7	Actual RIW	74		71	146	86
	Scenario RIW	94		52	146	97
Total	Actual RIW	656	396	769	1,822	54
	Scenario RIW	745	464	613	1,822	63
Family Practice RIW		38	73	403	513	
PTE	Actual	3.7	1.9	2.2	7.9	
PTE	Scenario	4.3	2.4	1.3	7.9	

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Nephrology – Scenario: Regions 1B and 2 (Centralized and Regional only)

Patient Came from Region		Dr. Georges Dumont	Saint John Regional Hospital	Elsewhere	Total RIW	Avg. Distance Travelled (km)
1	Actual RIW	236		25	261	23
	Scenario RIW	251		10	261	23
2	Actual RIW	4	140	2	145	34
	Scenario RIW	4	140	1	145	25
3	Actual RIW	3	86	30	119	115
	Scenario RIW	11	95	13	119	144
4	Actual RIW	1	0	60	61	74
	Scenario RIW	2	59	0	61	309
5	Actual RIW	42		7	48	245
	Scenario RIW	48		0	48	303
6	Actual RIW	97	5	27	129	159
	Scenario RIW	117	5	7	129	197
7	Actual RIW	53		26	79	117
	Scenario RIW	72		6	79	140
Total	Actual RIW	304	231	194	729	74
	Scenario RIW	393	299	37	729	96
Family Practice RIW		18	22	37	77	
PTE	Actual	3.6	1.3	1.2	6.3	
PTE	Scenario	4.2	2.0	0.0	6.3	

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**Nephrology –
Scenario: Region 1B
(Centralized and Regional only)**

Patient Came from Region		Dr. Georges Dumont	Elsewhere	Total RIW	Avg. Distance Travelled (km)
1	Actual RIW	236	25	261	23
	Scenario RIW	251	10	261	22
2	Actual RIW	4	141	145	24
	Scenario RIW	122	23	145	132
3	Actual RIW	3	116	119	115
	Scenario RIW	106	13	119	186
4	Actual RIW	1	60	61	74
	Scenario RIW	61	0	61	327
5	Actual RIW	42	7	48	245
	Scenario RIW	48	0	48	303
6	Actual RIW	97	32	129	159
	Scenario RIW	122	7	129	194
7	Actual RIW	53	26	79	117
	Scenario RIW	72	6	79	140
Total	Actual RIW	504	425	929	74
	Scenario RIW	870	59	929	125
Family Practice RIW		18	59	77	
FTE	Actual	3.6	2.7	6.3	
FTE	Scenario	6.3	0.0	6.3	

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**Nephrology –
Scenario: Region 2
(Centralized and Regional only)**

Patient Came from Region		Saint John Regional Hospitals	Elsewhere	Total RIW	Avg. Distance Travelled (km)
1	Actual RIW	0	261	261	23
	Scenario RIW	234	27	261	146
2	Actual RIW	140	6	145	24
	Scenario RIW	144	1	145	25
3	Actual RIW	86	33	119	115
	Scenario RIW	106	13	119	148
4	Actual RIW	0	61	61	74
	Scenario RIW	61	0	61	310
5	Actual RIW	0	48	48	245
	Scenario RIW	48	0	48	426
6	Actual RIW	5	124	129	159
	Scenario RIW	121	7	129	298
7	Actual RIW	0	79	79	117
	Scenario RIW	72	6	79	244
Total	Actual RIW	231	698	929	74
	Scenario RIW	874	55	929	168
Family Practice RIW		22	55	77	
FTE	Actual	4.0	12.4	16.4	
FTE	Scenario	16.4	0.0	16.4	

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Neurosurgery – Program Description

CMG	CMG Description	Distribution of Distribution	Total RIW	RIWs for Specialists
001	CRANIOTOMY PROCEDURES	Centralized	863	75
050	TRACHEOSTOMY AND GASTROSTOMY PROCEDURES FOR TRAUMA	Centralized	361	283
683	INTRACRANIAL INJURIES	Centralized	165	128
661	SPINAL PROCEDURES FOR TRAUMA	Centralized	164	133
003	SPINAL PROCEDURES	Centralized	107	73
660	INTRACRANIAL PROCEDURES FOR TRAUMA	Centralized	72	71
476	ADRENAL AND PITUITARY PROCEDURES	Centralized	57	20
940	TRACHEOSTOMY AND GASTROSTOMY PROCEDURES	Regional	649	110
365	BACK AND NECK PROCEDURES WITHOUT FUSION	Regional	331	134
007	PERIPHERAL CRANIAL NERVE AND OTHER NEUROLOGICAL PR	Regional	54	5
682	SPINAL INJURIES	Decentralized	266	32
695	OTHER CRANIAL INJURIES	Decentralized	137	29
678	SPINAL INJURIES WITH THORACO-ABDOMINAL INJURIES	Decentralized	60	7

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Neurosurgery -- Patient Flow (RIW)

Patient came from	Region	Treated at							Total
		RHC1B	RHC1SE	RHC2	RHC3	RHC4	RHC5	RHC6	
1		97	636	30				1	765
2			8	831	7			1	846
3			29	397	242		1		668
4			12	27	1	89	1	1	132
5			74	2			38	2	116
6		3	141	7			3	109	264
7		2	170	26	3			3	330
Other Provinces		1	341	24	3	4	14	8	395
Total		103	1,411	1,344	256	94	56	124	3,518

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Neurosurgery – Regional Relative Utilization Rates

Region	Actual Cases	Expected Cases	Utilization Rate
1	779	800	0.97
2	849	762	1.11
3	671	682	0.98
4	163	227	0.72
5	121	141	0.86
6	266	371	0.72
7	339	205	1.65

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Neurosurgery – Distribution of Specialists Among Hospitals

Hospital	Number of Specialists	Specialists with >100 RIW	Avg. RIW for Specialists with > 100 RIW	Total RIWs for all Specialists
NB	6	6	450	2698
The Moncton Hospital	3	3	490	1470
Saint John Regional Hospital	3	3	409	1228

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Neurosurgery – Case Distribution of Program Among Specialists and Other Physicians

Hospital	Number of Physicians with >50 RIWs for Program	Number of Physicians with >50 RIWs for Program	Number of Specialists with >50 RIWs for Program	Average RIWs for all Physicians	Average RIWs for Specialists	RIWs for Program
CH	242	9	8	230	123	2361
The Moncton Hospital	12	1	1	340	369	1366
Saint John Regional Hospital	33	1	1	189	278	1217
Dr. Everett Chalmers Regional Hospital	31	0	0	—	—	142
Atlantic Regional Healthcare	17	0	0	—	—	121

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Neurosurgery – Scenario: Regions 1SE and 2

Patient Came from Region		The Moncton Hospital	Saint John Regional Hospital	Elsewhere	Total RIW	Avg. Distance Travelled (km)
1	Actual RIW	623	29	104	757	22
	Scenario RIW	661	29	67	757	22
2	Actual RIW	8	813	18	838	32
	Scenario RIW	8	813	18	838	32
3	Actual RIW	29	394	240	663	85
	Scenario RIW	35	447	181	663	96
4	Actual RIW	12	25	91	129	57
	Scenario RIW	16	37	46	129	150
5	Actual RIW	73	2	42	117	109
	Scenario RIW	78	2	37	117	129
6	Actual RIW	138	7	116	261	115
	Scenario RIW	193	7	61	261	128
7	Actual RIW	165	22	133	321	69
	Scenario RIW	223	22	75	321	79
Total	Actual RIW	1,386	1,217	776	3,479	99
	Scenario RIW	1,563	1,411	505	3,479	72
Family Practice RIW		106	122	463	692	
FTE	Actual	4.0	3.7	1.0	8.6	
FTE	Scenario	4.5	4.0	0.1	8.6	

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Neurosurgery – Scenario: Region 1SE

Patient Came from Region		The Moncton Hospital	Elsewhere	Total RIW	Avg. Distance Travelled (km)
1	Actual RIW	623	134	757	22
	Scenario RIW	690	67	757	18
2	Actual RIW	8	831	838	32
	Scenario RIW	678	161	838	123
3	Actual RIW	29	634	663	85
	Scenario RIW	475	188	663	127
4	Actual RIW	12	117	129	57
	Scenario RIW	81	48	129	157
5	Actual RIW	73	44	117	105
	Scenario RIW	80	37	117	121
6	Actual RIW	138	123	261	115
	Scenario RIW	290	61	261	124
7	Actual RIW	165	156	321	69
	Scenario RIW	246	75	321	74
Total	Actual RIW	1,386	2,093	3,479	59
	Scenario RIW	2,822	657	3,479	99
Family Practice RIW		106	585	692	
FTE Actual		3.5	4.1	7.5	
FTE Scenario		7.4	0.2	7.5	

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Neurosurgery – Scenario: Region 2

Patient Came from Region		Saint John Regional Hospital	Elsewhere	Total RIW	Avg. Distance Travelled (km)
1	Actual RIW	29	728	757	22
	Scenario RIW	609	148	757	114
2	Actual RIW	813	25	838	32
	Scenario RIW	814	24	838	32
3	Actual RIW	394	269	663	85
	Scenario RIW	482	181	663	97
4	Actual RIW	25	104	129	57
	Scenario RIW	83	46	129	153
5	Actual RIW	2	115	117	105
	Scenario RIW	80	37	117	167
6	Actual RIW	7	254	261	115
	Scenario RIW	290	61	261	183
7	Actual RIW	22	299	321	69
	Scenario RIW	246	75	321	120
Total	Actual RIW	1,317	2,162	3,479	59
	Scenario RIW	2,860	619	3,479	104
Family Practice RIW		122	569	692	
FTE Actual		4.3	5.7	10.0	
FTE Scenario		9.9	0.2	10.0	

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Neonatology -- Program Description

CMG	CMG Description	Dimension of Distribution	Total RIW	RIWs for Specialists
629	NEONATES WEIGHT 1000-1499 GM WITHOUT CATASTROPHIC DIA	Centralized	345	300
632	NEONATES WEIGHT 1500-1999 GM WITH MOD OR MINOR OR N	Centralized	285	171
626	NEONATES WEIGHT 750-999 GRAMS	Centralized	179	166
625	NEONATES WEIGHT < 750 GRAMS	Centralized	145	140
631	NEONATES WEIGHT 1500-1999 GM WITH MAJOR PROBLEM DIA	Centralized	96	76
637	NEONATES WEIGHT 2000-2499 GM WITH MAJOR PROBLEM DIA	Centralized	94	44
645	NEONATES WEIGHT > 2500 GM WITH MODERATE PROBLEM DIA	Regional	366	136
647	NEONATES WEIGHT > 2500 GM WITH MINOR PROBLEM DIAGNO	Regional	299	61
644	NEONATES WEIGHT > 2500 GM WITH MAJOR PROBLEM DIAGNO	Regional	211	75
639	NEONATES WEIGHT 2000-2499 GM WITH MINOR PROBLEM DIA	Regional	204	80
638	NEONATES WEIGHT 2000-2499 GM WITH MODERATE PROBLEM	Regional	91	62

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Neonatology -- Patient Flow (RIW)

Region	Treated at								Total
	RHC1B	RHC1SE	RHC2	RHC3	RHC4	RHC5	RHC6	RHC7	
1	100	525	11			1		1	638
2		22	499	11					532
3			24	485	6		0		516
4			32	34	103	11	2		182
5		53				36	4		93
6	1	82	6				235		324
7	0	76		4			5	42	130
Other Provinces	1	77	6	9	2	13	2		110
Total	103	835	378	543	112	60	251	43	2,525

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Neonatology – Regional Relative Utilization Rates

Region	Actual Cases	Expected Cases	Utilization Rate
1	580	501	1.16
2	481	572	0.84
3	463	520	0.89
4	153	136	1.12
5	87	78	1.12
6	291	220	1.32
7	105	133	0.79

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Neonatology – Distribution of Program Among Specialists and Other Physicians

Hospital	Number of Physicians with R/Ws for Program	Number of Physicians with >10 R/Ws for Program	Number of Specialists with >10 R/Ws for Program	Average R/Ws for all Physicians	Average R/Ws for Specialists	R/Ws for Program
All	132	6	4	206	136	2138
The Masons Hospital	22	4	1	171	440	779
St. John Regional Hospital	12	2	2	247	247	118
St. Vincent Children Regional Hospital	29	1	1	361	361	487
Ballwin Regional Hospital	17	1	0	337	-	101

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**Neonatology –
Scenario: Regions 1SE, 2, and 3
(Centralized only)**

Patient Came from Region		The Moncton Hospital	Saint John Regional Hospital	Dr. Everett Chalmers Hospital	Elsewhere	Total RIW	Avg. Distance Travelled (km)
1	Actual RIW	118	9		21	148	19
	Scenario RIW	135	9		4	148	19
2	Actual RIW	9	301	6		317	31
	Scenario RIW	9	301	6		317	31
3	Actual RIW		13	269	13	295	64
	Scenario RIW		13	274	9	295	59
4	Actual RIW		29	32	33	94	105
	Scenario RIW		29	65	0	94	220
5	Actual RIW	46			4	50	175
	Scenario RIW	50			0	50	298
6	Actual RIW	71	4		65	141	124
	Scenario RIW	126	4		10	141	201
7	Actual RIW	38		3	12	53	95
	Scenario RIW	41		3	0	53	104
Total	Actual RIW	315	357	319	132	1,143	66
	Scenario RIW	398	357	356	32	1,143	91
Family Practice RIW		0	0	4	32	36	
FTE	Actual	1.2	1.3	1.2	0.5	4.2	
FTE	Scenario	1.5	1.3	1.3	0.0	4.2	

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**Neonatology –
Scenario: Regions 1SE and 2
(Centralized only)**

Patient Came from Region		The Moncton Hospital	Saint John Regional Hospital	Elsewhere	Total RIW	Avg. Distance Travelled (km)
1	Actual RIW	118	9	21	148	19
	Scenario RIW	135	9	4	148	19
2	Actual RIW	9	301	6	317	31
	Scenario RIW	9	308	0	317	29
3	Actual RIW	0	13	283	295	64
	Scenario RIW	14	269	13	295	130
4	Actual RIW	0	29	66	94	105
	Scenario RIW	5	88	0	94	293
5	Actual RIW	46		4	50	175
	Scenario RIW	50		0	50	298
6	Actual RIW	71	4	65	141	124
	Scenario RIW	126	4	10	141	201
7	Actual RIW	38	0	15	53	95
	Scenario RIW	41	3	0	53	112
Total	Actual RIW	315	357	471	1,143	66
	Scenario RIW	425	682	36	1,143	118
Family Practice RIW		0	0	36	36	
FTE	Actual	1.2	1.4	1.7	4.4	
FTE	Scenario	1.7	2.7	0.0	4.4	

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**Neonatology –
Scenario: Regions 1SE and 3
(Centralized only)**

Patient Came from Region		The Moncton Hospital	Dr. Everett Chalmers Hospital	Elsewhere	Total RIW	Avg Distance Travelled (km)
1	Actual RIW	118		30	148	19
	Scenario RIW	144		4	148	15
2	Actual RIW	9	6	301	317	31
	Scenario RIW	53	264	0	317	104
3	Actual RIW		269	26	295	64
	Scenario RIW		286	9	295	55
4	Actual RIW		32	62	94	105
	Scenario RIW		94	0	94	200
5	Actual RIW	40		4	50	175
	Scenario RIW	50		0	50	298
6	Actual RIW	71		69	141	124
	Scenario RIW	130		10	141	196
7	Actual RIW	38	3	12	53	95
	Scenario RIW	43	3	9	55	104
Total	Actual RIW	315	319	509	1,143	66
	Scenario RIW	455	656	32	1,143	104
Family Practice RIW		0	4	32	36	
FTE	Actual	1.1	1.1	1.7	3.9	
FTE	Scenario	1.6	2.3	0.0	3.9	

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**Neonatology –
Scenario: Regions 2 and 3
(Centralized only)**

Patient Came from Region		Saint John Regional Hospital	Dr. Everett Chalmers Hospital	Elsewhere	Total RIW	Avg Distance Travelled (km)
1	Actual RIW	9	0	139	148	19
	Scenario RIW	144	1	4	148	145
2	Actual RIW	301	6	9	317	31
	Scenario RIW	311	6	0	317	28
3	Actual RIW	13	269	13	295	64
	Scenario RIW	13	274	9	295	50
4	Actual RIW	29	32	33	94	105
	Scenario RIW	29	65	0	94	220
5	Actual RIW		0	50	50	175
	Scenario RIW		50	0	50	360
6	Actual RIW	4	0	136	141	124
	Scenario RIW	7	123	10	141	231
7	Actual RIW	0	3	50	53	95
	Scenario RIW	1	44	9	55	134
Total	Actual RIW	357	319	467	1,143	66
	Scenario RIW	503	607	32	1,143	117
Family Practice RIW		0	4	32	36	
FTE	Actual	1.4	1.2	1.7	4.2	
FTE	Scenario	1.9	2.3	0.0	4.2	

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**Neonatology –
Scenario: Region 1SE
(Centralized, only)**

Patient Came from Region		The Moncton Hospital	Elsewhere	Total RIW	Avg. Distance Travelled (km)
1	Actual RIW	118	30	148	19
	Scenario RIW	144	4	148	15
2	Actual RIW	9	308	317	31
	Scenario RIW	317	0	317	144
3	Actual RIW	0	295	295	64
	Scenario RIW	283	13	295	177
4	Actual RIW	0	94	94	105
	Scenario RIW	94	0	94	318
5	Actual RIW	46	4	50	175
	Scenario RIW	50	0	50	298
6	Actual RIW	71	60	141	124
	Scenario RIW	130	10	141	196
7	Actual RIW	38	15	53	95
	Scenario RIW	44	9	53	118
Total	Actual RIW	315	828	1,143	66
	Scenario RIW	1,107	36	1,143	161
Family Practice RIW		0	36	36	
FTE Actual		1.2	2.9	4.1	
FTE Scenario		4.1	0.0	4.1	

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**Neonatology –
Scenario: Region 2
(Centralized only)**

Patient Came from Region		Saint John Regional Hospital	Elsewhere	Total RIW	Avg. Distance Travelled (km)
1	Actual RIW	9	139	148	19
	Scenario RIW	144	4	148	147
2	Actual RIW	301	16	317	31
	Scenario RIW	317	0	317	26
3	Actual RIW	13	283	295	64
	Scenario RIW	283	13	295	131
4	Actual RIW	29	66	94	105
	Scenario RIW	94	0	94	298
5	Actual RIW	0	50	50	175
	Scenario RIW	50	0	50	420
6	Actual RIW	4	136	141	124
	Scenario RIW	130	10	141	303
7	Actual RIW	0	53	53	95
	Scenario RIW	44	9	53	192
Total	Actual RIW	357	786	1,143	66
	Scenario RIW	1,107	36	1,143	159
Family Practice RIW		0	36	36	
FTE Actual		1.5	3.2	4.7	
FTE Scenario		4.7	0.0	4.7	

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Neonatology - Scenario: Region 3 (Centralized only)

Patient Came from Region	Dr. Everett Chalmers Hospital	Elsewhere	Total RIW	Avg. Distance Travelled (km)
1 Actual RIW	0	148	148	19
Scenario RIW	144	4	148	169
2 Actual RIW	6	311	317	31
Scenario RIW	317	0	317	105
3 Actual RIW	299	26	295	84
Scenario RIW	286	9	295	35
4 Actual RIW	32	62	94	105
Scenario RIW	94	0	94	200
5 Actual RIW	0	50	50	173
Scenario RIW	50	0	50	360
6 Actual RIW	0	141	141	124
Scenario RIW	130	10	141	227
7 Actual RIW	3	50	53	95
Scenario RIW	44	9	53	136
Total Actual RIW	319	624	1,143	96
Scenario RIW	1,111	32	1,143	136
Family Practice RIW	4	32	36	
FTE Actual	1.1	2.7	3.8	
FTE Scenario	3.8	0.0	3.8	

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Cardiovascular Surgery -- Program Description

CMG	CMG Description	Degree of Distribution	Total RIW	RIWs for Specialists
178	CORONARY BYPASS WITH HEART PUMP WITH CARDIAC CATH	Centralized	963	749
179	CORONARY BYPASS WITH HEART PUMP WITHOUT CARDIAC CAT	Centralized	513	483
177	CARDIAC VALVE REPLACEMENT WITH HEART PUMP WITHOUT C	Centralized	474	427
176	CARDIAC VALVE REPLACEMENT WITH HEART PUMP WITH CARD	Centralized	235	163
182	OTHER CARDIO-THORACIC PROCEDURES WITH HEART PUMP BT	Centralized	77	37

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Cardiovascular Surgery -- Patient Flow (RIW)

Patient came from	Region	Treated at								Total
		RHC1B	RHC1SE	RHC2	RHC3	RHC4	RHC5	RHC6	RHC7	
1		-	-	436	-	-	-	-	-	436
2		-	-	679	-	-	-	-	-	679
3		-	-	392	-	-	-	-	-	392
4		-	-	151	-	-	-	-	-	151
5		-	-	86	-	-	-	-	-	86
6		-	-	171	-	-	-	-	-	171
7		-	-	184	-	-	-	-	-	184
Other Provinces		-	-	103	-	-	-	-	-	103
Total		-	-	2,202	-	-	-	-	-	2,202

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Cardiovascular Surgery: Regional Relative Utilization Rates

Region	Actual Cases	Expected Cases	Utilization Rate
1	455	568	0.80
2	686	532	1.29
3	420	471	0.89
4	162	158	1.02
5	97	104	0.93
6	218	259	0.84
7	198	145	1.37

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Cardiovascular Surgery: Distribution of Specialists Among Hospitals

Hospital	Number of Specialists	Specialists with >100 RIW	Avg. RIW for Specialists with > 100 RIW	Total RIWs for all Specialists
IND	3	3	663	1989
Saint John Regional Hospital	3	3	663	1989

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Cardiovascular Surgery: Case Distribution of Program Among Specialists and Other Physicians

Hospital	Number of Physicians with RIWs for Program	Number of Physicians with >50 RIWs for Program	Number of Specialists with >50 RIWs for Program	Average RIWs for all Physicians	Average RIWs for Specialists	RIWs for Program
IND	23	6	3	351	629	2340
Saint John Regional Hospital	17	3	3	399	628	2205

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Cardiovascular Surgery – RIW and Average Distance Travelled

Patient Came from Region	Saint John Regional Hospital RIW	Total RIW	Avg. Distance Travelled (km)
1	437	437	152
2	679	679	34
3	392	392	151
4	151	151	340
5	86	86	415
6	171	171	325
7	184	184	248
Total	2202	2202	172
FP RIW Actual	5	5	
FTE Actual	3.5	3.5	

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Centralized Cardiology – RIW and Average Distance Travelled

Patient Came from Region	Saint John Regional Hospital RIW	Total RIW	Avg. Distance Travelled (km)
1	305	305	156
2	814	814	31
3	378	378	146
4	97	97	336
5	81	81	404
6	131	131	343
7	148	148	247
Total	2100	2100	168
FP RIW Actual	18	18	
FTE Actual	8	8	

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Trauma – Program Description

CMG	CMG Description	RIW	Program	Dimension of Distribution
650	TRACHEOSTOMY AND GASTROSTOMY PROCEDURES FOR TRAUMA	891	Neurosurgery	Centralized
683	INTRACRANIAL INJURIES	487	Neurosurgery	Centralized
661	SPINAL PROCEDURES FOR TRAUMA	424	Neurosurgery	Centralized
660	INTRACRANIAL PROCEDURES FOR TRAUMA	281	Neurosurgery	Centralized
662	FEMUR OR PELVIC PROCEDURES FOR TRAUMA	5307	Orthopaedic Surgery	Regional
666	MAJOR LOWER EXTREMITY PROCEDURES FOR TRAUMA	2252	Orthopaedic Surgery	Regional
670	UPPER EXTREMITY PROCEDURES FOR TRAUMA	1561	Orthopaedic Surgery	Regional
803	EXTENSIVE PROCEDURES FOR INJURY OR COMPLICATION OF	1385	Orthopaedic Surgery	Regional
804	NON-EXTENSIVE PROCEDURES FOR INJURY OR COMPLICATION	1116	Vascular Surgery	Regional
664	WOUND DEBRIDEMENT AND SKIN GRAFT FOR TRAUMA	896	Plastic Surgery	Regional
668	MISCELLANEOUS MUSCULOSKELETAL PROCEDURES FOR TRAUMA	303	Plastic Surgery	Regional
663	THORACO-ABDOMINAL PROCEDURES FOR TRAUMA	302	General Surgery	Regional
658	FEMUR PROCEDURES WITH WOUND DEBRIDEMENT OR LOWER EX	296	Orthopaedic Surgery	Regional
694	FACIAL INJURIES	239	Plastic Surgery	Regional
653	INTRACRANIAL OR FEMUR PROCEDURES WITH THORACO-ABDOM	157	Orthopaedic Surgery	Regional
693	AMPUTATIONS OR VASCULAR AND OTHER NERVE INJURIES	111	Plastic Surgery	Regional

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Trauma: Distribution of RIWs among Specialist Types

HOSPITAL	ORTHOPEDIC SURGEON	NEURO-SURGEON	PLASTIC SURGEON	FAMILY PRACTITIONER	GENERAL SURGEON	VASCULAR SURGEON
Saint John Regional Hospital	721	305	106	74	44	19
The Moncton Hospital	574	451	85	16	14	70
Dr. Everett Chalmers Regional Hospital	612	0	83	33	29	72
Dr. Georges L. Dumont Hospital	413	0	26	13	48	23
Bathurst Regional Hospital	310	0	68	9	16	0
Edmundston Regional Hospital	274	0	0	10	30	7
Miramichi Regional Hospital	165	0	0	47	17	0
Campbellton Regional Hospital	82	0	0	20	12	0

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Outpatient Visits by Hospital and Program (1)

HOSPITAL	GENERAL PRACTICE	INTERNAL MEDICINE	ORTHO SURGERY	GENERAL SURGERY	OTOLARY NGOLOGY	OPS/GYN	NEPHROL OGY	OPHTHAL MOLOGY	UROLOGY
Steen John Regional Hospital	1,082	6,893	10,268	4,290	1,360	4,372	13,481	3,116	5,712
Dr. Georges L. Duhaime Hospital	12,827	11,038	6,446	4,665	0	6,155	10,319	3,211	2,618
The Moncton Hospital	5,504	5,235	5,085	1,810	9,223	5,259	0	3,768	1,362
Dr. Everett Chisholm Regional Hospital	6,363	5,281	5,764	1,977	4,784	3,766	0	1,400	1,469
Belmont Regional Hospital	5,734	7,530	4,724	4,216	6,373	3,440	0	652	1,819
Centre Hospitalier de Coquitlam	19,378	0	0	1,062	0	378	0	0	0
Edmonton Regional Hospital	2,898	12,368	5,219	2,023	5,209	7,646	0	2,534	1,019
Cremon Hospital de Trois-Rivières	35,438	0	0	0	0	0	0	0	0
Grand Falls General Hospital	26,910	0	0	1,642	0	185	0	0	0
The Catholic Memorial Hospital (Woodstock)	19,862	1,941	0	1,741	0	0	0	11	0
Stella Maris de Kent Hospital	20,117	0	0	0	0	0	0	0	0
Chadstone County Hospital (St. Stephen)	16,995	0	0	2,606	0	0	0	0	0
Alameda Regional Hospital	5,253	3,461	5,354	1,516	0	697	0	1,379	1,092
The Oromocto Hospital	15,283	0	0	0	0	0	0	2,701	0
Northern Golden Hospital (Bella)	17,772	0	0	0	0	0	0	0	0
Cambridge Regional Hospital	986	1,971	2,736	4,079	1,963	738	0	1,824	1,537
St. Joseph Hospital (Chatham)	13,680	0	0	0	0	0	0	0	0
Sacred Heart Memorial Hospital	7,461	437	0	0	0	0	0	0	0
Hôtel Dieu de St. Joseph (Saint-Quentin)	6,404	0	0	0	0	0	0	0	0
Hôtel Dieu de St. Joseph (Fort-Auvergne)	4,940	0	0	906	0	0	0	0	0
Saxony Health Centre	2,602	0	0	1,040	0	0	0	0	0
Tobique Valley Hospital (Planoir Rock)	2,334	0	0	0	0	0	0	0	0
Albert County Hospital	1,028	0	0	0	0	0	0	0	0
Quebec North Hospital (Maine)	1,002	0	0	0	0	0	0	0	0
Grand Manan Hospital	461	0	0	0	0	0	0	0	0
Centre Hospitalier de Lunenburg	308	0	0	0	0	0	0	0	0
St. Casimir Centre for Rehab	0	0	0	0	0	0	0	0	0

NOTE: Use caution in interpreting these data. They are from the physician billing database and therefore may have inconsistent definitions for visits or other issues affecting data quality.

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Outpatient Visits by Hospital and Program (2)

HOSPITAL	CARDIOLOGY	PLASTIC SURGERY	NEUROLOGY	DERMATO LOGY	GASTROENT EROLOGY	HEMATOL OGY	ANAESTHESIA	PEDIATRICS
Steen John Regional Hospital	4,477	1,704	4,118	873	2,679	2,339	0	2,403
Dr. Georges L. Duhaime Hospital	4,268	1,243	0	3,523	125	0	396	86
The Moncton Hospital	1,486	1,725	4,415	0	2,780	8,133	46	1,294
Dr. Everett Chisholm Regional Hospital	321	3,185	0	193	2,714	0	3,119	804
Belmont Regional Hospital	0	950	0	4,876	2,111	0	4	6,586
Centre Hospitalier de Coquitlam	0	0	0	0	0	0	0	0
Edmonton Regional Hospital	0	0	0	0	0	0	1,122	455
Cremon Hospital de Trois-Rivières	0	0	0	0	0	0	0	0
Grand Falls General Hospital	0	0	0	0	0	0	0	0
The Catholic Memorial Hospital (Woodstock)	0	0	0	0	0	0	0	0
Stella Maris de Kent Hospital	0	0	0	0	0	0	0	0
Chadstone County Hospital (St. Stephen)	0	0	0	0	0	0	0	0
Alameda Regional Hospital	0	0	0	0	0	0	0	76
The Oromocto Hospital	0	0	0	0	0	0	487	0
Northern Golden Hospital (Bella)	0	0	0	0	0	0	0	0
Cambridge Regional Hospital	0	0	0	0	0	0	0	131
St. Joseph Hospital (Chatham)	0	0	0	0	16	0	0	0
Sacred Heart Memorial Hospital	0	0	0	0	0	0	0	0
Hôtel Dieu de St. Joseph (Saint-Quentin)	0	0	0	0	0	0	0	0
Hôtel Dieu de St. Joseph (Fort-Auvergne)	0	0	0	0	0	0	0	0
Saxony Health Centre	0	0	0	0	0	0	0	0
Tobique Valley Hospital (Planoir Rock)	0	0	0	0	0	0	0	0
Albert County Hospital	0	0	0	0	0	0	0	0
Quebec North Hospital (Maine)	0	0	0	0	0	0	0	0
Grand Manan Hospital	0	0	0	0	0	0	0	0
Centre Hospitalier de Lunenburg	0	0	0	0	0	0	0	0
St. Casimir Centre for Rehab	0	0	0	0	0	0	0	0

NOTE: Use caution in interpreting these data. They are from the physician billing database and therefore may have inconsistent definitions for visits or other issues affecting data quality.

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Outpatient Visits by Hospital and Program (3)

HOSPITAL	PAEDIATRIC SURGERY	RESP MEDICINE	PHYSICAL MED/REHAB	RHEUMATOLOGY	PSYCH	ENDOCRIN METABOLISM	THERAP RADIOLOGY	MEDICAL ONC.	THORACIC SURGERY
Steen John Regional Hospital	332	1,388	1,499	101	894	1,194	1,384	401	0
Dr. Georges L. Dumas Hospital	0	1,284	23	2,414	28	118	1,121	289	0
The Moncton Hospital	1,085	0	12	134	1,085	0	0	0	794
Dr. Everett Chisholm Regional Hospital	1,021	0	3,229	1,029	1,095	0	0	1,943	794
Bellevue Regional Hospital	0	0	0	0	28	0	0	0	0
Centre Hospitalier de Gaspésie	0	0	0	0	0	0	0	0	0
Edmundston Regional Hospital	1,196	0	0	0	144	0	0	0	0
Centre Hospitalier de Trochu	0	0	0	0	0	0	0	0	0
Grand Falls General Hospital	0	0	0	0	0	0	0	0	0
The Capreol Memorial Hospital (Woodville)	0	0	0	0	0	0	0	0	0
Stella-Marie de Ruis Hospital	0	0	0	0	0	0	0	0	0
Chandler County Hospital (St. Joseph)	0	0	0	0	0	0	0	0	0
Moncton Regional Hospital	0	0	0	0	0	0	0	0	0
The Chatham Hospital	0	0	0	0	0	0	0	0	0
Northwest Columbia Hospital (Bellefleur)	0	0	0	0	0	0	0	0	0
Campbellton Regional Hospital	0	0	0	0	0	0	0	0	0
St. Joseph Hospital (Edmundston)	0	0	0	0	0	0	0	0	0
St. Charles Regional Hospital	0	0	0	0	0	0	0	0	0
Hôtel Dieu de St. Joseph (St. Charles)	0	0	0	0	0	0	0	0	0
Hôtel Dieu de St. Joseph (St. Charles)	0	0	0	0	0	0	0	0	0
St. Joseph Health Centre	0	0	0	0	0	0	0	0	0
Tobique Valley Hospital (Pleasant Rock)	0	0	0	0	0	0	0	0	0
Albion County Hospital	0	0	0	0	0	0	0	0	0
Quebec North Hospital (Maine)	0	0	0	0	0	0	0	0	0
Grand Station Hospital	0	0	0	0	0	0	0	0	0
Centre Hospitalier de L'Annapolis	0	0	0	0	0	0	0	0	0
St. Charles Center for Health	0	0	0	0	0	0	0	0	0

NOTE: Use caution in interpreting these data. They are from the physician billing database and therefore may have inconsistent definitions for visits or other issues affecting data quality.

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Outpatient Visits by Hospital and Program (4)

HOSPITAL	MEDICAL MICROBIOLOGY	CARDIAC/THOR SURGERY	RADIATION ONCOLOGY	NEURO SURGERY	GERIATRIC MEDICINE	ORAL SURGERY	DENTIST	INFECTIOUS DISEASES
Steen John Regional Hospital	0	0	313	0	0	25	0	0
Dr. Georges L. Dumas Hospital	415	343	0	0	0	12	4	0
The Moncton Hospital	0	0	0	24	106	0	28	22
Dr. Everett Chisholm Regional Hospital	0	0	0	0	0	19	0	0
Bellevue Regional Hospital	0	0	0	0	0	0	0	0
Centre Hospitalier de Gaspésie	0	0	0	0	0	0	0	0
Edmundston Regional Hospital	0	0	0	0	0	0	0	0
Centre Hospitalier de Trochu	0	0	0	0	0	0	0	0
Grand Falls General Hospital	0	0	0	0	0	0	0	0
The Capreol Memorial Hospital (Woodville)	0	0	0	0	0	0	0	0
Stella-Marie de Ruis Hospital	0	0	0	0	0	0	0	0
Chandler County Hospital (St. Joseph)	0	0	0	0	0	0	0	0
Moncton Regional Hospital	0	0	0	0	0	0	0	0
The Chatham Hospital	0	0	0	0	0	0	0	0
Northwest Columbia Hospital (Bellefleur)	0	0	0	0	0	0	0	0
Campbellton Regional Hospital	0	0	0	0	0	0	0	0
St. Joseph Hospital (Edmundston)	0	0	0	0	0	0	0	0
St. Charles Regional Hospital	0	0	0	0	0	0	0	0
Hôtel Dieu de St. Joseph (St. Charles)	0	0	0	0	0	0	0	0
Hôtel Dieu de St. Joseph (St. Charles)	0	0	0	0	0	0	0	0
St. Joseph Health Centre	0	0	0	0	0	0	0	0
Tobique Valley Hospital (Pleasant Rock)	0	0	0	0	0	0	0	0
Albion County Hospital	0	0	0	0	0	0	0	0
Quebec North Hospital (Maine)	0	0	0	0	0	0	0	0
Grand Station Hospital	0	0	0	0	0	0	0	0
Centre Hospitalier de L'Annapolis	0	0	0	0	0	0	0	0
St. Charles Center for Health	0	0	0	0	0	0	0	0

NOTE: Use caution in interpreting these data. They are from the physician billing database and therefore may have inconsistent definitions for visits or other issues affecting data quality.

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Outpatient Visits by Hospital
and Program (1)

Outpatient Visits by Hospital
and Program (2)

Hospital Inpatient RIWs by Program (1)

[illegible]

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Hospital Inpatient RIWs by Program (2)

HOSPITAL	CARDIOLOGY	PLASTIC SURGERY	NEUROLOGY	DERMATO- LOGY	GASTROENT- EROLOGY	HEMATOL- OLOGY	ANALGESIA	PEDIATRICS
San Jose Regional Hospital	2,162	594	405	5	543	362	38	395
Dr. Gonzalez L. Duran Hospital	928	327	0	7	0	0	34	188
The Maricao Hospital	136	494	195	0	540	1,134	0	1,372
Dr. Ernest Guzman Regional Hospital	137	672	0	4	190	0	55	870
Bachman Regional Hospital	0	377	0	0	319	0	1	651
Cancer Hospital de Caracas	0	0	0	0	0	0	0	0
Edmundo Regional Hospital	0	0	0	0	0	0	17	144
Cooper Hospital de Trujillo	0	0	0	0	0	0	0	0
Dr. Fidel General Hospital	0	0	0	0	0	0	0	0
The Caracas Memorial Hospital (Woodstock)	0	0	0	0	0	0	0	0
Santa Maria de Nari Hospital	0	0	0	0	0	0	0	0
Guillermo Gomez Hospital (St. Stephen)	0	0	0	0	0	0	0	0
Morales Regional Hospital	0	0	0	0	0	0	47	24
The Oromuco Hospital	0	0	0	0	0	0	7	0
Northem Caracas Hospital (Bach)	0	0	0	0	0	0	0	0
Caracas Regional Hospital	0	0	0	0	0	0	0	237
St. Joseph Hospital (Cabrera)	0	0	0	0	0	0	0	0
Sacred Heart Hospital	0	0	0	0	0	0	0	0
Hueli Dios de St. Joseph (San Jose)	0	0	0	0	0	0	0	0
Hueli Dios de St. Joseph (Ponle-Aguero)	0	0	0	0	0	0	0	0
Sancti Spiritus Center	0	0	0	0	0	0	0	0
Tolague Valley Hospital (Ponle-Aguero)	0	0	0	0	0	0	0	0
Albert Casanova Hospital	0	0	0	0	0	0	0	0
Quinto Monte Hospital (Bach)	0	0	0	0	0	0	0	0
Quinto Monte Hospital (Bach)	0	0	0	0	0	0	0	0
Cooper Hospital de Trujillo	0	0	0	0	0	0	0	0
San Carlos Center for Surgery	0	0	0	0	0	0	0	0
San Carlos Center for Surgery	0	0	0	0	0	0	0	0

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Hospital Inpatient RIWs by Program (3)

HOSPITAL	VASCULAR SURGERY	RESP MEDICINE	PHYSICAL MED/REHAB	RHEUMAT LOGY	PSYCH	ENDOCRIN METABOLISM	THERAPEUTIC RADIOLOGY	MEDICAL ONCOLOGY	THORACIC SURGERY
St. John's Regional Hospital	488	361	122	197	442	130	261	175	2
Dr. Georges L. Dumont Hospital	0	391	12	18	137	104	74	122	0
The Moncton Hospital	1,432	0	300	220	907	0	0	0	180
Dr. Everett Chalmers Regional Hospital	145	0	7	78	541	0	0	140	476
Bathurst Regional Hospital	0	0	0	0	429	0	0	0	0
Centre Hospitalier de Lévis	0	0	0	0	0	0	0	0	0
Edmondston Regional Hospital	1,158	0	0	0	19	0	0	0	0
Centre Hospitalier de Trois-Rivières	0	0	0	0	0	0	0	0	0
Grand Falls General Hospital	0	0	0	0	0	0	0	0	0
The Capital Regional Hospital (Woodstock)	0	0	0	0	0	0	0	0	0
Stella Maris de Kootenai Hospital	0	0	0	0	0	0	0	0	0
Chatham County Hospital (St. Joseph)	0	0	0	0	0	0	0	0	0
Alameda Regional Hospital	0	0	0	0	112	0	0	0	0
The Chatham Hospital	0	0	0	0	0	0	0	0	0
Northwest London Hospital (Burlington)	0	0	0	0	0	0	0	0	0
Cambridge Regional Hospital	0	0	0	0	144	0	0	0	0
St. Joseph Hospital (Edmonton)	0	0	0	0	0	0	0	0	0
Secord Regional Hospital	0	0	0	0	0	0	0	0	0
West Delta (St. Joseph) (West Delta)	0	0	0	0	0	0	0	0	0
West Delta (St. Joseph) (West Delta)	0	0	0	0	0	0	0	0	0
St. Mary's Health Centre	0	0	0	0	0	0	0	0	0
Township Valley Hospital (Pawson Park)	0	0	0	0	0	0	0	0	0
Albert County Hospital	0	0	0	0	0	0	0	0	0
Quebec North Hospital (Miramichi)	0	0	0	0	0	0	0	0	0
Grand Miramichi Hospital	0	0	0	0	0	0	0	0	0
Centre Hospitalier de Lunenburg	0	0	0	0	0	0	0	0	0
St. Charles General (St. John's)	0	0	120	0	0	0	0	0	0

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Hospital Inpatient RIWs by Program (4)

HOSPITAL	MEDICAL MICROBIOLOGY	CARDIAC/ THORACIC	RADIATION ONCOLOGY	MEDICAL ONCOLOGY NCERT	NUCLEAR MEDICINE	GERIATRIC MEDICINE	ORAL SURGERY	DENTIST	INFECTIOUS DISEASES
St. John's Regional Hospital	0	1,089	41	0	0	181	47	11	82
Dr. Georges L. Dumont Hospital	0	424	0	0	0	0	42	0	0
The Moncton Hospital	0	0	0	0	0	12	0	22	728
Dr. Everett Chalmers Regional Hospital	0	0	0	0	0	0	30	0	0
Bathurst Regional Hospital	0	0	0	0	0	0	144	0	0
Centre Hospitalier de Lévis	0	0	0	0	0	0	0	0	0
Edmondston Regional Hospital	0	0	0	0	0	0	0	0	0
Centre Hospitalier de Trois-Rivières	0	0	0	0	0	0	0	0	0
Grand Falls General Hospital	0	0	0	0	0	0	0	0	0
The Capital Regional Hospital (Woodstock)	0	0	0	0	0	0	0	0	0
Stella Maris de Kootenai Hospital	0	0	0	0	0	0	0	0	0
Chatham County Hospital (St. Joseph)	0	0	0	0	0	0	0	0	0
Alameda Regional Hospital	0	0	0	0	0	0	0	84	0
The Chatham Hospital	0	0	0	0	0	0	0	0	0
Northwest London Hospital (Burlington)	0	0	0	0	0	0	0	0	0
Cambridge Regional Hospital	0	0	0	0	0	0	0	0	0
St. Joseph Hospital (Edmonton)	0	0	0	0	0	0	0	0	0
Secord Regional Hospital	0	0	0	0	0	0	0	0	0
West Delta (St. Joseph) (West Delta)	0	0	0	0	0	0	0	0	0
West Delta (St. Joseph) (West Delta)	0	0	0	0	0	0	0	0	0
St. Mary's Health Centre	0	0	0	0	0	0	0	0	0
Township Valley Hospital (Pawson Park)	0	0	0	0	0	0	0	0	0
Albert County Hospital	0	0	0	0	0	0	0	0	0
Quebec North Hospital (Miramichi)	0	0	0	0	0	0	0	0	0
Grand Miramichi Hospital	0	0	0	0	0	0	0	0	0
Centre Hospitalier de Lunenburg	0	0	0	0	0	0	0	0	0
St. Charles General (St. John's)	0	0	0	0	0	0	0	0	0

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Active Physicians by Specialty

Physician Specialty	Physicians with Greater than 200 Office Visits	Physicians with Greater than 200 Office Visits	Physicians with Greater than 200 Outpatient Visits
GENERAL PRACTICE	210	211	218
GENERAL SURGERY	39	44	42
INTERNAL MEDICINE	25	31	38
GYN/OBYN	31	38	36
ORTHOPEDIC SURGERY	28	28	32
OPHTHALMOLOGY	15	29	23
UROLOGY	17	17	21
PEDIATRICS	18	28	18
RAHEALTHCARE	9	9	25
PLASTIC SURGERY	11	11	11
OTOLARYNGOLOGY	13	13	18
PSYCHIATRY	18	32	32
NEUROLOGY	2	31	31
THYROID/ENDOCRINE	1	0	0
GASTROENTEROLOGY	1	4	0
CARDIOLOGY	0	5	0
VASCULAR SURGERY	1	1	1
NEPHROLOGY	0	4	7
DERMATOLOGY	0	20	9
RHEUMATOLOGY	1	1	1
PHYSICAL MED & REHAB	1	1	4
RESPIRATORY MEDICINE	1	1	1
ENDOCRINE & METABOLISM	1	2	1
THYROID SURGERY	2	2	2
MEDICAL ONCOLOGY	2	1	1
NEURAL MICROBIOLOGY	0	0	0
HEMATOLOGY	2	2	2
RADIATION ONCOLOGY	0	0	1
NUCLEAR MEDICINE	0	0	1
GERIATRIC MEDICINE	1	1	1
EMERGENCY MEDICINE	0	0	1
CARDIAC & THOR SURG	4	4	1
ORAL SURGERY	1	0	0
NEUROSURGERY	4	4	0
INFECTIOUS DISEASES	2	0	0

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